

# THE IRON AGE

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## Cost Keeping in a Jobbing Foundry

A System Planned so That Heavy and Light Castings Shall Carry the Proper Division of the Non-Productive Element

BY JAMES M. MORTON\*

The principal difficulty experienced by the average foundry making both light and heavy castings is the proper division of the non-productive element. In other words, large heavy castings or floor work cost a great deal less to clean per pound than the same tonnage in light castings or bench work. Now it certainly is not fair that the heavier class of work should carry the same non-productive burden. How this may be properly proportioned is one of the important objects of this article.

In the majority of jobbing foundries it has been

get at the tax which each molding or productive hour should stand to take care of the non-productive element. We may take the total amount paid on account of non-productive wages which embraces such labor as chipping, cleaning, grinding, shipping, drumming and general labor, and divide it by the number of producing molding hours, this being, of course, five-sixths of the number given in the second column. The result gives the proper tax to add to each molder's or producing hour and one is then absolutely certain that his entire non-productive

Table 1—Non-Producing Rate Record

Week Ending	Total Molding Hours	Producing Molding Hours	Bench Producing Molding Hours	Floor Producing Molding Hours	Total Non-Producing Amount	Bench Non-Producing Amount	Floor Non-Producing Amount	Total Non-Producing Rate	Bench Non-Producing Rate	Floor Non-Producing Rate
May 6, 1914.....	5690	4742	2740	2002	\$1043.24	\$667.60	\$375.64	\$ .22	\$ .24	\$ .18 $\frac{1}{2}$
May 13, 1914.....										
May 20, 1914.....										

Table 2—Labor Record

Week Ending	Good Castings Produced, Lb.	MOLDERS		CORE-MAKERS		NON-PRODUCTIVE		MELTING LABOR		FOUNDRY SUPPLIES	
		Amount	Per Lb. Good C't'gs.	Amount	Per Lb. Good C't'gs.	Amount	Per Lb. Good C't'gs.	Amount	Per Lb. Good C't'gs.	Amount	Per Lb. Good C't'gs.
May 6, 1914.....	325,600	\$2276.00	\$ .007	\$480.50	\$ .0015	\$1043.24	\$ .0032	\$120.50	\$ .00037	\$270.00	\$ .0009
May 13, 1914.....											
May 20, 1914.....											

found that the molders average 7½ hr. actually molding or producing in the 9-hr. day, the remainder of their time, 1½ hr., being used in pouring-off. Consider a molder with a rate of 40 cents per hour; he is actually producing but five-sixths of the time for which he is being paid. Multiply his rate of 40 cents per hour by six-fifths and we have 48 cents per hour, which is the proper rate to use for his molding or actual producing time, and the cost clerk does not have to worry as to how he will split up the pouring time.

From such a record as given in table 1, we may

element is taken care of to the penny and that each pound of casting is standing its proportionate share of the non-productive labor.

In order to divide the tax so that the heavy work shall not carry more than its share, or part of the burden of the light work, one should divide the cleaning, shipping and general labor or non-productive pay-roll into two divisions: 1, light castings; 2, heavy castings. Then distinctly designate the parting lines between the two divisions, so that employees will fully understand when "light castings" stop and "heavy castings" begin. When employees make out their time for the day's work, each employee or his foreman marks the slip according

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The George F. Shevlin Mfg. Co.  
FOUNDRY DEPARTMENT

Iron Foundry \_\_\_\_\_ Cupola No. 9 Date May 24-1914

	lbs.	\$	Pile No.	SL	Sub.	Flux	Mng.	Tot'l Carbon
Pig Iron # <u>17497</u>	<u>18000</u>		<u>*4</u>	<u>754</u>	<u>02</u>	<u>54</u>	<u>96</u>	
" " # <u>15940</u>	<u>48000</u>		<u>*9</u>	<u>198</u>	<u>02</u>	<u>47</u>	<u>102</u>	
" "								
" "								
Return Scrap	<u>26500</u>							
Purchased "								
Steel "								
				Estimated Analysis				
				Chemist's Analysis				
Total Charge	<u>107500</u>		Cupola Coke	<u>17500</u>		Melting Ratio	<u>1-8.4</u>	
Good Castings lbs.	<u>69045</u>		Heat On	<u>750</u>		Bottom Dropped	<u>455</u>	
Bad "	<u>875</u>		Total Time of Heat	<u>2-05</u>		Total Melted per hr.	<u>254</u>	
Gates and Sprues	<u>24500</u>		Condition of Metal	<u>Hyd</u>		Transverse Strength	<u>3750</u>	
Cupola Loss	<u>8150</u>							
REMARKS—								

Fig. 1—The Daily Melting Report. Filed chronologically, it serves a useful purpose when complaint is made by a customer regarding his castings. The condition and composition of the metal going into the castings is recorded; and on occasion a chemical analysis is obtained as a check against an estimated analysis.

to the class or classes of work done for that day. the number of bad and good castings, and the individual weight and total weights of good and bad

Core-makers are treated as assistant producers

The George F. Shevlin Mfg. Co. Foundry Department

MATERIAL	IRON			ACID BRONZE			BRONZE			COPPER BRONZE			WHITE METAL		
	lbs.	Amount	%	lbs.	Amount	%	lbs.	Amount	%	lbs.	Amount	%	lbs.	Amount	%
Gross Melt	<u>107500</u>	<u>736</u>	<u>00</u>												
Good Castings	<u>69045</u>														
Bad "	<u>875</u>														
Gates and Sprues	<u>24500</u>	<u>194</u>	<u>50</u>												
Melting Loss	<u>8150</u>														
Net Melt	<u>94350</u>	<u>541</u>	<u>50</u>												
Coke	<u>17500</u>	<u>37</u>	<u>50</u>												
Melting Labor		<u>17</u>	<u>50</u>												
Total Cost Hot Metal		<u>591</u>	<u>50</u>												
Cost Hot Metal per lb.		<u>.0086</u>													

Fig. 2—A Tabulation Made as Often as May be Needed to Ascertain the Unit Cost of the Hot Metal. The totals of good and bad castings are obtainable from the daily cast record, Fig. 3, and from the value of the gross melt is deducted the value of the gates and sprues and to the remainder is added the coke and melting-labor costs in order to ascertain the pound cost of the good castings.

FOUNDRIES DEPARTMENT. DAILY CAST RECORD. Date \_\_\_\_\_

MOLDER	PATTERN No.	CUSTOMER	Cast Card No.	No. Pieces Cast	Bad Castings	Good Castings	Weight Per Piece	Total Weight Good Castings	Total Weight Bad Castings
<u>#713</u>	<u>52-a</u>	<u>White Mfg Co.</u>	<u>a2</u>	<u>80</u>	<u>5</u>	<u>75</u>	<u>3</u>	<u>225</u>	<u>15</u>

Fig. 3—The Daily Cast Record, Which Is a Long Sheet, to Allow for Entering All the Pattern Numbers of Which Molds Are Made, Is Filled In by the Cost Clerk Except for the Items Covering the Condition and Weight of Castings, Which Information Is Recorded by the Castings Inspector or Shipper.

and their time should be figured at their regular rate.

A good labor record form, which keeps the executive in close touch with comparative reports on labor and supplies and their varying costs per pound good castings, is shown in Table 2. An increase or decrease may mean many things, but one thing is certain: any noticeable fluctuation in the cost per pound of good castings should mean immediate investigation by the executive. Many things will be brought to his attention that will mean either success or failure if not handled promptly and effectively. The table simply shows the main headings but may be kept in detail if so desired with as many headings or sub-headings as the foundry executive thinks necessary.

FOUNDRIES DEPARTMENT.

Pattern No. 1904-B Core Boxes 2 Shell No. 1489

Description Locker Box Box No. 127-a

Customer White Mfg Co.

Delivered to	Date
<u>Pattern Storage</u>	<u>7/1/14</u>
<u>Pattern Shop</u>	<u>7/2/14</u>
<u>Pattern Storage</u>	<u>7/4/14</u>
<u>Foundry</u>	<u>7/10/14</u>

Fig. 4—Pattern Record Card, Filled According to Pattern Number, Showing the Location of the Pattern at Any Time

castings. It then comes to the cost clerk who transfers the necessary information to the cost cards. A rapid-computing elapsed-time job card is not only a time saver in figuring costs, but a cost condenser as well, the figured cost and detail cost being on the same card. An idea of the card may be

columns could be provided if conditions warranted. In the case of radiator foundries or shops, where the core work was a big item, the writer suggests using this card for the core department bearing same job number as molders' card but of a different color, and showing on the molder's or master card that a core card was issued for the job.

FOUNDRIES DEPARTMENT.

No. 2 Customer *Wm. McG. Co* Date *7/1/14*

Pat. No. *5712* Pieces Ordered *1000* Date Assigned *7/1/14*

Remarks \_\_\_\_\_

Worker	Molds Made	How Worked	Castings Made	Good Castings	Weight Per Piece	1/2 in. Good Castings	Hrs.	Rate	Hrs.	Rate													
713	8	13	45	9	10	15	30	45	11	30	45	2	35	30	45	3	30	45	4	15	30	45	5
713	8	13	45	9	10	15	30	45	11	30	45	2	35	30	45	3	30	45	4	15	30	45	5
713	8	13	45	9	10	15	30	45	11	30	45	2	35	30	45	3	30	45	4	15	30	45	5
713	8	13	45	9	10	15	30	45	11	30	45	2	35	30	45	3	30	45	4	15	30	45	5
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713	8	13	45	9	10	15	30	45	11	30	45	2	35	30	45	3	30	45	4	15	30	45	5
713	8	13	45	9	10	15	30	45	11	30	45	2	35	30	45	3	30	45	4	15	30	45	5
713	8	13	45	9	10	15	30	45	11	30	45	2	35	30	45	3	30	45	4	15	30	45	5
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713	8	13	45	9	10	15	30	45	11	30	45	2	35	30	45	3	30	45	4	15	30	45	5



## PROTECTIVE WELDING HELMET

### A Unique and Simple Device to Protect Welding and Cutting Operators

The Julius King Optical Company, 10 Maiden lane, New York City, has placed on the market a unique and simple helmet, designed to afford protection to electric arc and autogenous welding and cutting operators in their work. The helmet is known as the Bowers, after the patentee, F. M. Bowers, superintendent of maintenance, American Steel Foundries, Chester, Pa. It has for its object the provision of an inexpensive shield or mask, which may be fastened to the head of the operator, leaving both hands free for work, and one that could be easily changed from the operative to the inoperative position without removing it from the head of the wearer.

The helmet as a whole was designed from actual experience and conditions and is the result of several years of investigation and experimental work. The helmet is made of aluminum and weighs slightly less than 28 oz. As an additional protection to the operator, this helmet is designed to allow the operator's wearing a pair of safety spectacles, which are found especially desirable when making welds requiring puddling or hammering, or cutting large sections of steel, where it becomes necessary for the operator to get a clear and unobstructed view of his work from time to time.

A striking feature of the helmet is the general outline which is formed by two curved sheets riveted together at the edge, where they diverge from each other. This edge forms the front of the helmet which resembles the longitudinal half of a flattened ovoid and differs only from the helmet of the old knights in that it is more pointed in the front. This construction presents a convex surface, the entire area of which is angularly disposed to the heat rays of the welding or cutting flame, which is relied upon to prevent the pene-



Helmet for the Protection of Electric Arc and Autogenous Welding and Cutting Operators Showing It in the Operative Position and Turned Back to Show Frame and Skull Cap

tration of the heat rays to a great extent by deflecting them.

There is a rectangular opening that is centrally located and recessed from the front edges of the helmet. Three pieces of glass are fitted into this opening, for protecting the eyes against the welding arcs, the first or outside one being ordinary transparent window glass, while the second and third are composed of red and blue glasses of special density. This combination is relied upon to produce a reddish purple, which is the color best suited for electric welding or cutting. The function of the first or transparent glass is to catch or obstruct all incandescent particles of iron and steel emitted from the welding or cutting oper-



The Helmet in Use in Connection with an Arc Welding Operation in a Foundry



ation, thus saving the more expensive colored glass, as the ordinary transparent piece can be replaced at little or no cost. All three glasses are fitted to allow for the rapid expansion and contraction which this protective apparatus is subjected to. A large angle of vision is afforded to the wearer by the opening, and it is emphasized that its fixed position in relation to the eyes is restful and enables the operator to concentrate on the object to be welded or cut.

Brackets pivotally connected to and carried by a light skeleton band adapted to encircle the head of the wearer as shown in one of the accompanying engravings form a support for the helmet. The helmet can be revolved about the pivotal connection and placed in either the operative or the non-operative position. It is pointed out that the location of this connection is such that when the helmet is in the operative position, no matter how far out of the perpendicular, the lower edges of the helmet will fall or press against the chest of the wearer and form a seal to exclude light, heat and obnoxious gases emitted from the welding or cutting operation, the helmet in use in a steel foundry being shown in one of the engravings. When the helmet is in the non-operative position the upper edges rest on the operator's back, which enables him to move about at will without disturbing or releasing the helmet. This position is desirable at times when the operator is compelled to move quickly and save time during an important welding or cutting operation.

A light woolen skull cap with a sweat band is secured to the inner edges of the skeleton frame of the helmet. The cap forms a support for the skeleton frame and serves as an additional protection to the wearer from flying particles of incandescent iron and steel, and also keeps his head free from oxide of iron given out by the welding or cutting process.

### A 5-Ft. Heavy Radial Drilling Machine

The Fosdick Machine Tool Company, Cincinnati, Ohio, has placed on the market a 5-ft. heavy duty radial drilling machine, which is similar in design to the 3-ft. tool which was illustrated in *The Iron Age*, July 31, 1913. A large oil channel is cast around the base and runs completely around the column, where it drains into a large reservoir. Another feature of the machine is the design of the table which has oil channels draining to a pocket in one corner.

The placing of a channel around the base, it is emphasized, gives a full ribbed cross-section of the base at a point immediately in front of the column, where great rigidity is required and allows the T-slots to extend back beyond the front of the column, which renders the full working surface of the base available. A receptacle may be placed under the pocket in the table to receive the lubricant used in the smaller drilling and tapping operations, thus eliminating the necessity of a pump and piping.

The column is of the double tubular type, with a fixed inner member extending to the top, where large annular and thrust ball bearings insure easy swinging of the arm. The column clamping lever, as well as the other principal operating and clamping levers, is a malleable

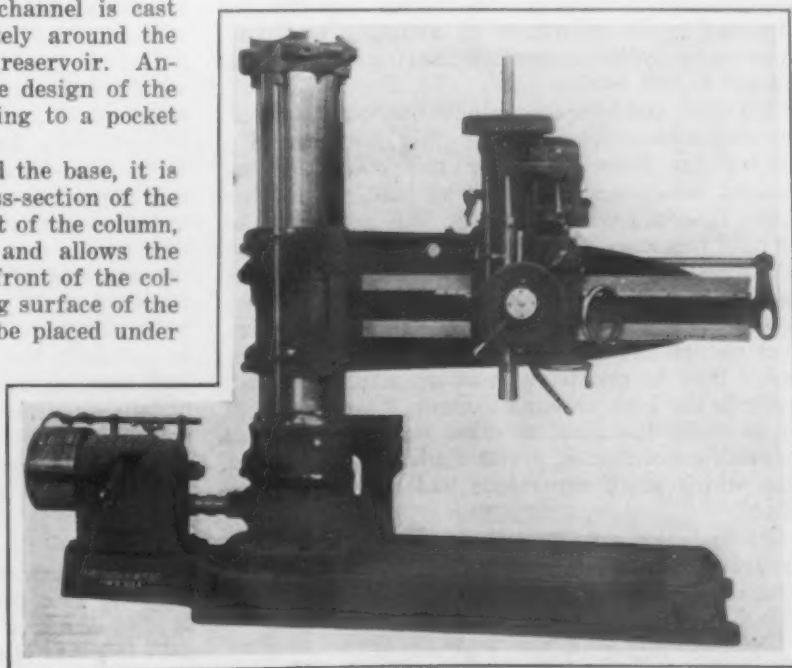
casting and is located close to the column, so as not to interfere with work on the base when the arm is swung around over the table. The arm is of pipe and beam section, which construction is relied upon to give great resistance to torsional and bending strain. The clamping levers are located in the front in a handy position. The elevating screw is suspended on a ball thrust bearing and lowers the arm at double the elevating speed. It cannot be engaged accidentally and a safety knockout is provided for both extremes of the 35-in. arm travel.

The head is moved along the arm for 51 in. by a compound ball bearing spiral gear and the hand-wheel is placed at the right, so that only the right hand is required to swing the arm and move the head simultaneously, while the left hand is free to raise or lower the spindle. The feed box is placed low on the head to give support to both sides of the feed worm, which is mounted on a ball thrust bearing and runs in oil. Five feed changes ranging from 0.007 to 0.031 in. per revolution of the spindle are available and are indexed to a drilling plate, which is attached to the arm girdle.

The spindle, which has a traverse of 18 in., takes the thrust on a special ball bearing, and the double back gears on the head give three speed changes with a single lever. The total number of feeds available are 18, and these range from 17 to 391 r.p.m. An automatic trip and depth gauge, which always reads from zero, may be set to the exact depth desired, in any position of the spindle. A safety trip is provided for the extreme of its travel.

The speed box contains an overtake arrangement which keeps the machine running at a reduced speed when changes are being made, this arrangement being relied upon to avoid shock. A latch pin is employed to secure the tumbler and prevent chattering on heavy work.

The machine is designed so that a motor drive may be added at any time without the necessity of a special base or speed box. Constant-speed or adjustable-speed motors having a range of 3 to 1 can be used. These motors, which vary from 7½ to 10 hp., are connected by rawhide gearing. The floor space required by the machine measures 11½ x 14 ft. and the net weight is approximately 10,500 lb.



A New 5-Ft. Round Column Heavy Duty Radial Drilling Machine

# Progress in the Smelting of Mayari Ore\*

Experiences with the Fine High Alumina  
Cuban Ores—Coke from Washed Coal—  
Elaborate Tests on No. 1 Furnace at Steelton

BY RICHARD V. M'KAY†

(With Supplemental Plate)

Mr. Brassert's statement that "with more and more difficult raw materials, progress is not always in the direction of new records of production and fuel consumption, but in the ability to maintain the best results of the past in the face of greater handicaps," has particular application to the progress made in the last six years in developing the practice of smelting the high alumina Cuban ores in the blast furnace. The fundamental conditions have been somewhat different as between progress made in Mesaba versus that in Cuban ore practice. In the latter case, it has not been a struggle to retain ground already conquered. It has been one of aspiring to the high standards previously set by Mesaba practice. During the entire period, the Cuban ore furnaceman has been on the under side. He has been fighting to do as good work on these ores, which in their natural condition might be termed low grade, as had previously been done on Lake ores, without ever daring to think that he could surpass the results obtained in earlier practice. All the odds seemed against him.

Before proceeding with the more or less detailed account of the various steps in the march toward the latest very satisfactory results in smelting Mayari ore, it might be interesting to picture some of the obstacles, some visible and some otherwise, which lay in the path of the metallurgist and engineer, when the Mayari ore fields were discovered in 1904.

## CONDITIONS IN THE MAYARI ORE FIELDS

Indeed, the deposit was enormous in extent but it was located some 2000 ft. above sea level on a plateau difficult of access, miles away from the sea coast, and hundreds of miles away from the blast furnaces which were to be supplied, in an almost uninhabited, insect and fever infested district. The problem of mining was simple, but the ore contained great quantities of moisture and combined water, which necessitated drying before being shipped to the States.

To erect and operate an industrial plant with all the requisite accessories for this purpose, in a country far from the labor and manufacturing markets, was not a very inviting task, yet in view of the freight saving on water, this seemed to be the only recourse. The ore was extremely fine, and naturally, since nodulizing was but one step further than drying, there seemed no reason why the two results could not be obtained in a single operation. Thus opened the immense field of nodulizing problems. Due to excessive moisture and, no doubt, partly to the high alumina content, Mayari ore was not so easily nodulized as other materials, such as Cornwall concentrates, pyrite cinder, flue dust, etc., upon which much experience had previously been gained.

Preliminary experiments were conducted with Mayari ore in a nodulizing kiln at the Lebanon Plant of the Pennsylvania Steel Company, and indi-

cated that there was no apparent difficulty in forming nodules, neither was the fuel consumption considered excessive. However, when the somewhat larger kilns, designed for greater capacities, were placed in operation at Felton, Cuba, with the best labor available, which was none too good, it was discovered that many lessons were yet to be learned. Extensive mechanical changes were necessitated to adapt the plant to tropical conditions. Machinery which was at all complicated, or which necessitated intelligence in operation had to be eliminated as far as possible, for the Cuban and imported labor proved quite unreliable.

Besides this, Mayari ore in the raw state was handled with great difficulty, due to its sticky, clayey consistency, and the original bucket elevators and conveyors gave way to the gantry cranes and grab buckets. In the raw state, the ore would stand in a pile at a 90 deg. angle, and even when grab buckets were installed, the question of handling was not entirely solved. This same natural condition of the ore gave no end of trouble in obtaining regular feed to the kilns. Various constant feed devices were tried out, until the present revolving platform feed was settled upon as the best to meet the conditions. Had the plant been located within easy reach of a manufacturing center, all of these difficulties could have been corrected within a short period of time and at fairly small expense, but since it was necessary to build all machinery in the States and ship to Cuba, months were consumed, where under similar conditions in industrial plants more favorably located, it would have been a matter of days.

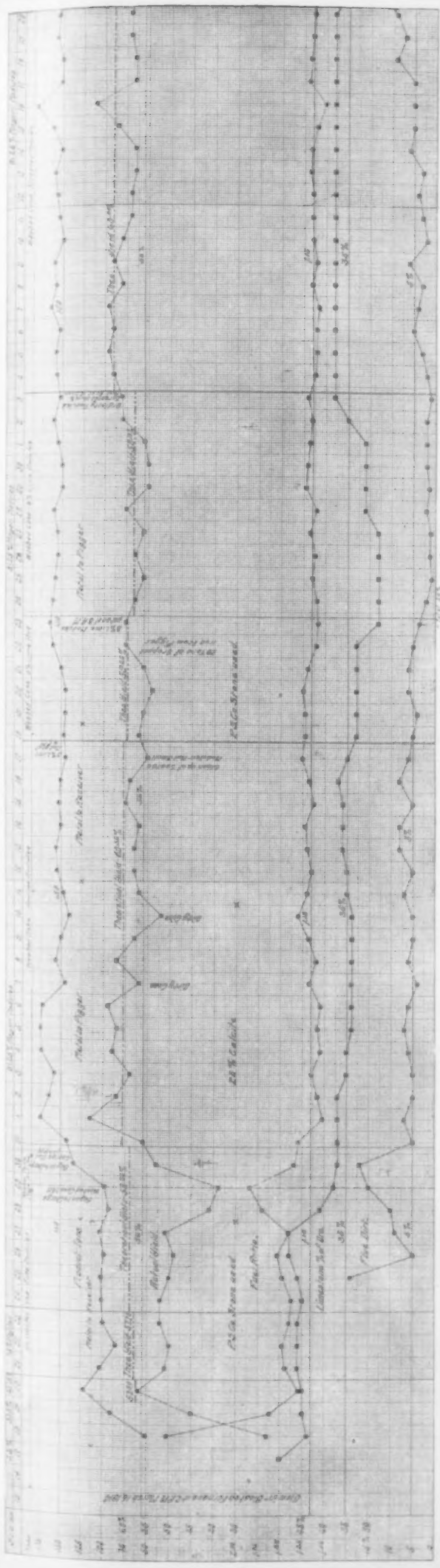
## NODULIZING AND BLAST FURNACE PROBLEMS

Concerning the quality of nodules produced, it was assumed at an early date that 90 per cent. remaining on a 40-mesh screen should be satisfactory for blast furnace use. This size was assumed with Lake practice as a basis, the idea being to get ore somewhat coarser than the Mesabas. With this standard set, operations at the Felton plant were brought to a fairly satisfactory basis. Kiln tonnages were increased gradually to a maximum of 9 tons per hour and fuel consumption was reduced at the same time. However, the quality of ore produced gave excessive flue dirt losses in the blast furnace, and it was found necessary to make a new standard of 75 per cent. material remaining on 10-mesh screen. This more recent standard resulted in reducing the kiln tonnages and increasing the fuel consumption, but by using binders in the nodulizing process satisfactory results have been obtained. Since successful blast furnace practice demands the coarser nodules, it will be upon this basis that the future advances will be made in Cuba.

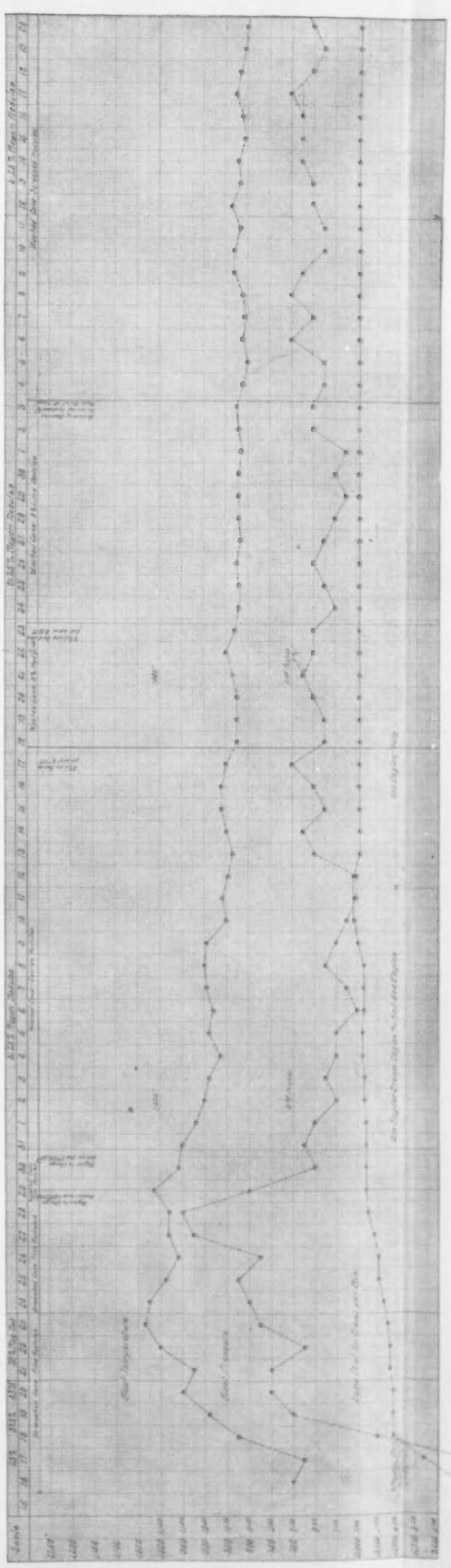
Following the nodulizing problems came those of the blast furnace. Uncertainty centered about the behavior of a furnace carrying such high percentages of alumina in the slag. There was no precedent to guide the furnaceman and naturally he had to be extremely cautious. In September and October, 1904, experiments were conducted on a small

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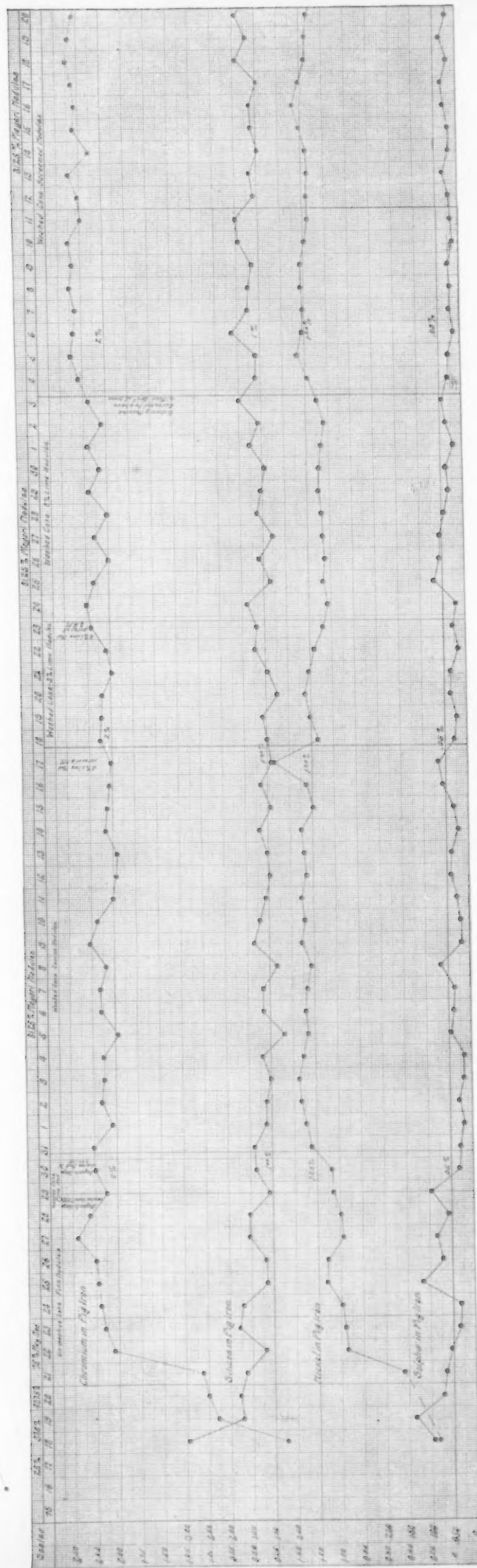
BURDEN AND YIELD



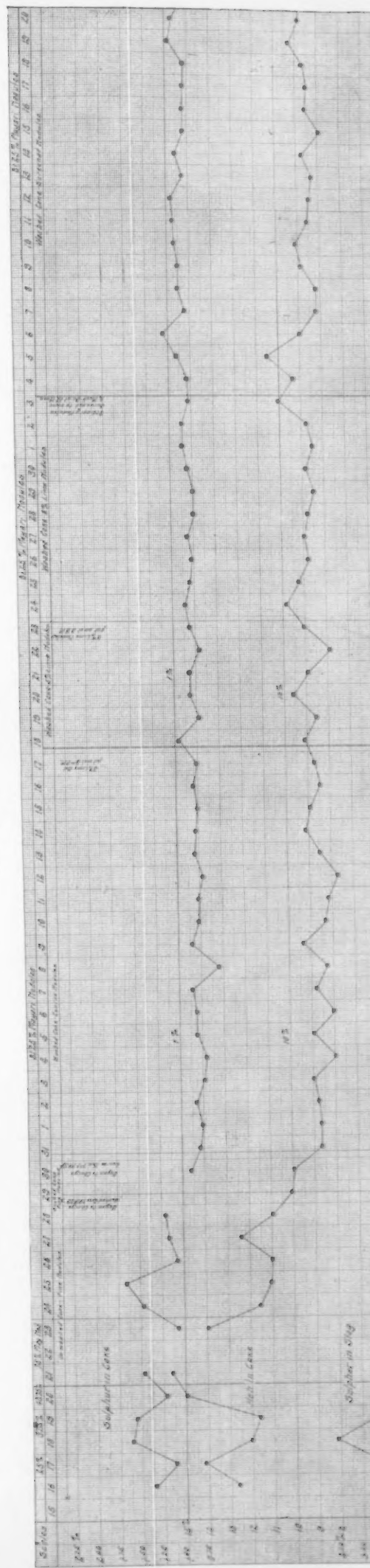
CONDITIONS OF BLAST

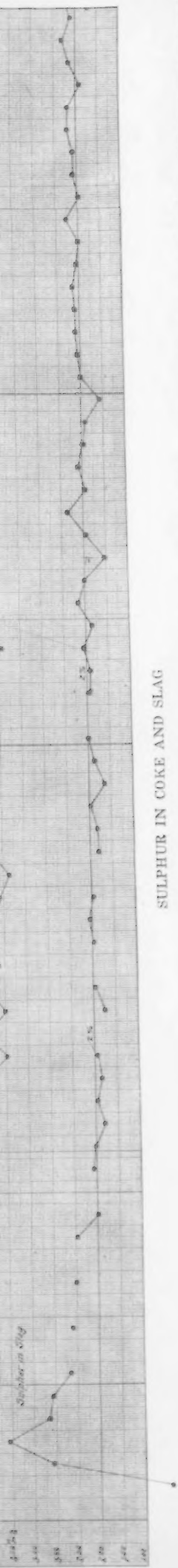


# CONDITIONS OF BLAST

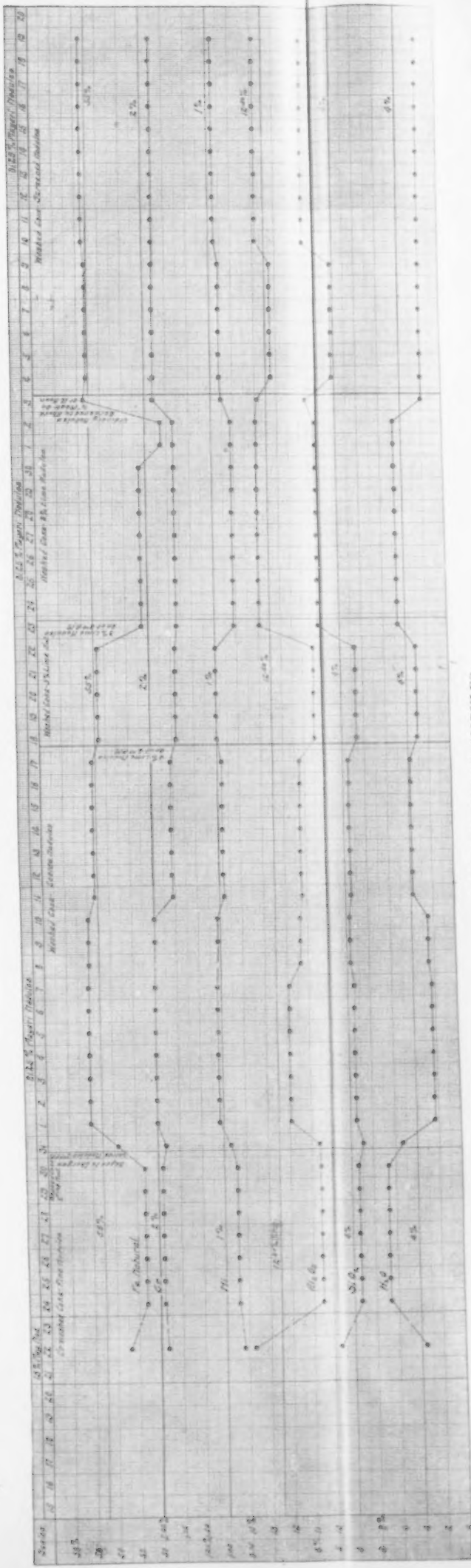


# COMPOSITION OF IRON

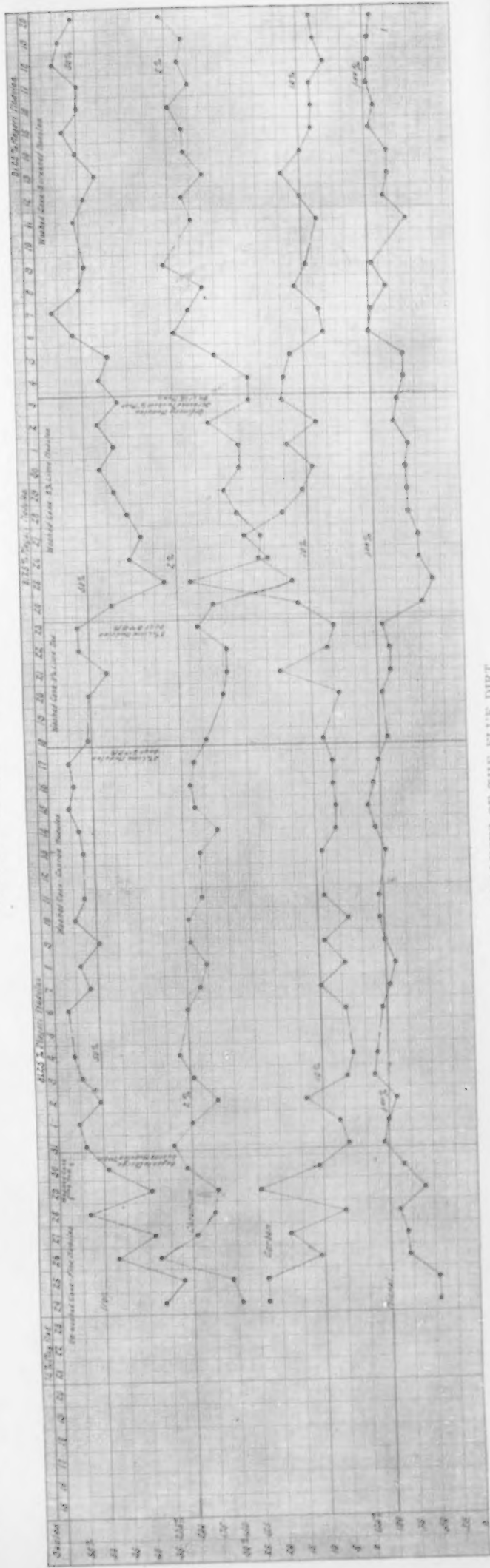




SULPHUR IN COKE AND SLAG



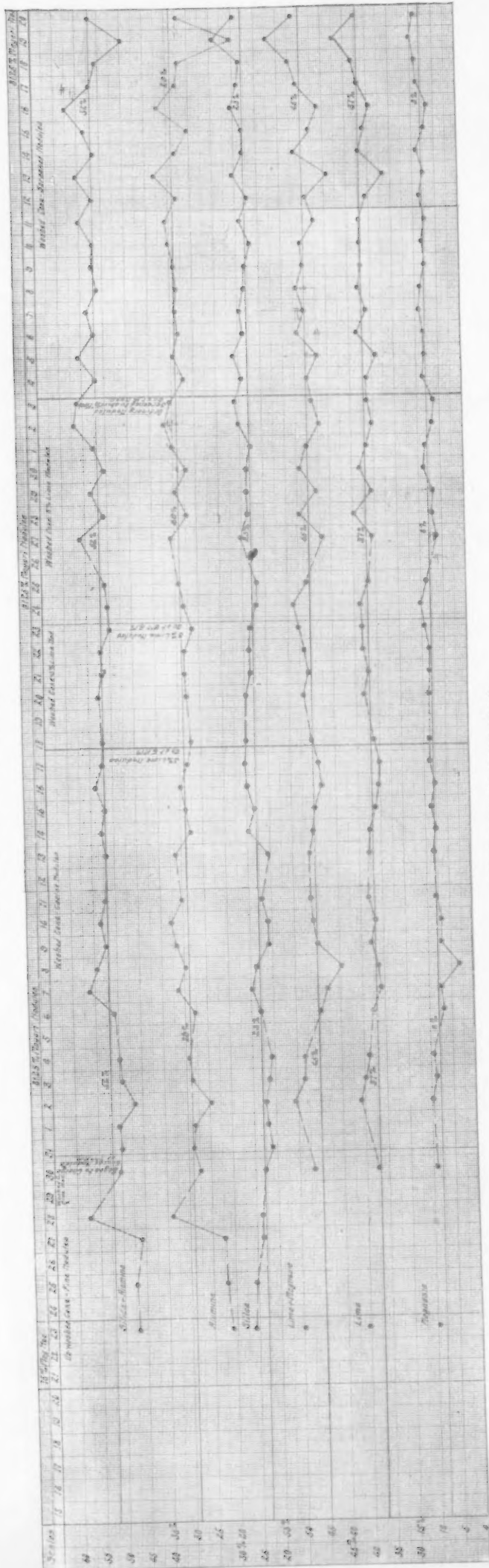
ANALYSES OF THE NODULES



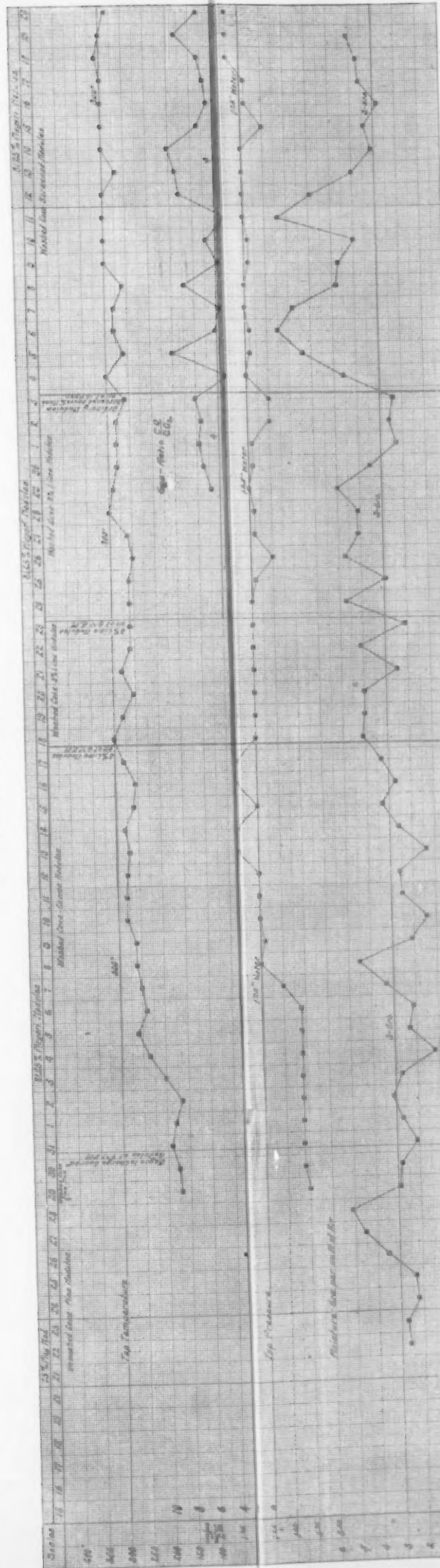
ANALYSES OF THE FLUE DIRT



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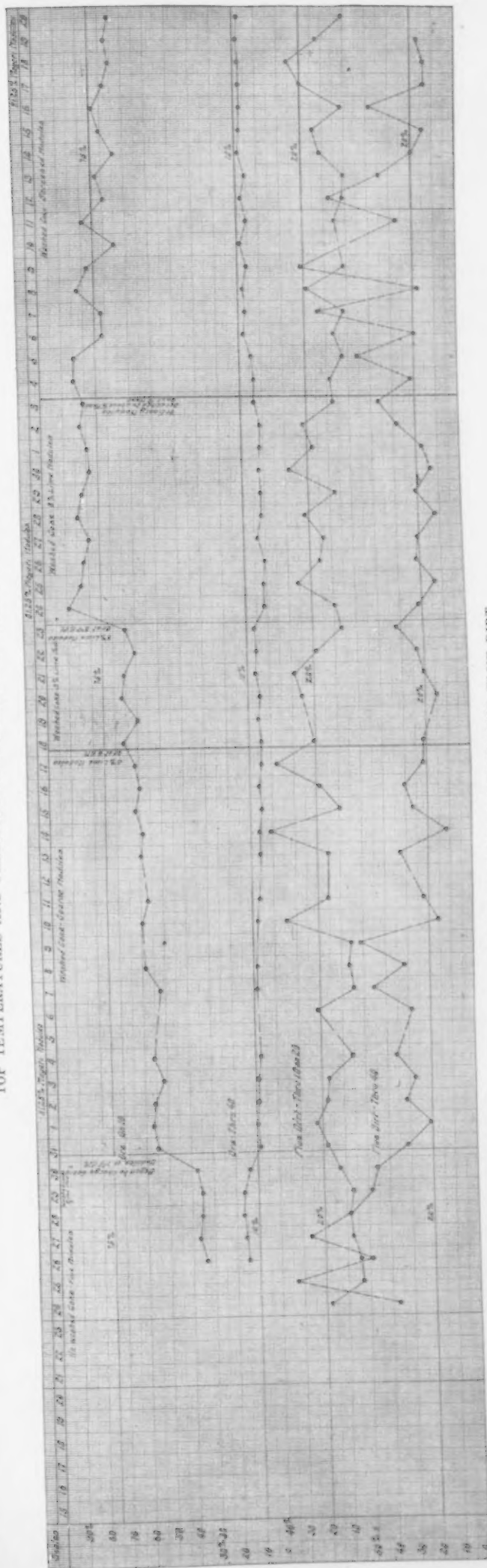


# ANALYSES OF THE SLAG





# TOP TEMPERATURES AND PRESSURES AND MOISTURE CONTENT OF THE AIR



## SIZING TESTS ON NODULES AND FLUE DIRT

RUNS ON HIGH PERCENTAGES OF MAYARI ORE, NO. 1 BLAST FURNACE, PENNSYLVANIA STEEL COMPANY, STEELTON, PA.



furnace at the Steelton plant of the Pennsylvania Steel Company to determine some facts concerning this important question. By means of Lake ore, chromite, brick bats and bauxite, a furnace mixture was concocted approximating Mayari ore in chemical composition. The test run lasted 11 days during which time the furnace averaged 102 tons on a 1 to 1 fuel ratio. This mixture worked with sufficient success as to the character of slag and general furnace conditions, to warrant a small shipment of ore from the mountains in the Mayari district. About 1200 tons was transported on mule back from the deposit at El Perio to the sea coast, and shipped to Steelton, where it was tried with more or less success on No. 1 furnace in February, 1906.

This test was of six days duration, the furnace averaging 59.5 tons of iron per day on a fuel ratio of 2.13. The flue dirt was excessive, however, and as a result the actual yield of pig iron was but 29 per cent.

Notwithstanding the unfavorable results as to fuel ratio and yield, the fact was established that the alumina content of the ore presented no insurmountable difficulties but it was conceded that the physical condition of the ore would require considerable attention. Further shipments of raw ore, and later nodules, were made to the States and converted into iron from which the steel maker had an opportunity to determine his skill in the elimination of chromium. Suffice it to say that the troubles of the open hearth and Bessemer man were many, but this phase of the Mayari problem was worked out economically far in advance of the blast furnace difficulties.

Unlike the conditions which surrounded the development of Mesaba practice, experiment on the Mayari ores was confined to the resources and equipment of one company with coke, generally speaking, of an inferior quality and a limited corps of furnace operators. With but two plants available for experiment, and these not equipped for handling such varied conditions while conducting their routine business, progress was naturally delayed. Problems had to be solved one by one, and at the time best suited not to interfere with the regular output of iron and steel.

#### THE MAYARI ORE

As mined, Mayari ore has approximately the following chemical composition:

Fe 38.14, H<sub>2</sub>O 23.22, SiO<sub>2</sub> 2.00, Al<sub>2</sub>O<sub>3</sub> 10.00, Mn. 0.51, P 0.013, S 0.15, Cr 1.46, Ni 0.57, Combined water 11.50.

It consists of a mixture of hydrated iron oxide, limonite, with hydrated aluminum oxide, bauxite, and the oxides of nickel, chromium and cobalt. In appearance the ore is a reddish yellow to dark red in color, and is of a decidedly clayey consistency.

Following is a sizing test made on the raw ore after it had been thoroughly dried, which will indicate the extreme fineness of the ore. For comparison, I have placed this beside the Mesaba screen test which Mr. Brassert shows in his paper.

Gross	Screens							
	No. 2	No. 8	No. 20	No. 40	No. 60	No. 80	No. 100	Thru 100
Mesaba	25.40	26.86	12.54	10.86	6.92	2.76	3.34	11.33
Mayari (raw)	0.00	27.72	34.36	18.93	6.03	4.07	1.05	7.84

With large percentages of raw Mayari ore in a furnace mixture, violent slips occurred and made operations extremely irregular. Perhaps the most logical explanation is that the 11 to 13 per cent. of combined water caused the trouble. No doubt, following a period during which the furnace was hanging, the stock was precipitated into the lower zones

where the temperature was great enough to drive off the combined water. The sudden generation of steam caused an explosion which gave the typical fine ore slip. These did considerable damage to the old fashioned open top furnaces, both at Sparrow's Point and Steelton, especially at the former plant where more experimenting was done on the larger capacity furnaces.

#### NODULIZING

At an early date considerable preliminary experimenting was done to determine the most feasible means of preparing the ore. The use of briquetted raw ore lost favor, chiefly on account of mechanical difficulties and cost of production. A machine was built for the purpose of rolling the ore into corrugated sheets which were afterward sintered. This likewise proved expensive and did not bring the answer. Finally, nodulizing was determined upon as the most promising method, and the erection of a plant was begun in Cuba. The fact that the Pennsylvania Steel Company already had nodulizing kilns in successful operation at Steelton and Lebanon on Cornwall concentrates, pyrite cinder, flue dust, etc., no doubt encouraged the use of the kiln.

The first kiln went into commission November, 1909, and the first shipment of nodules was made in December of that year. At present, the plant consists of twelve kilns; eleven, 10 ft. shell diameter by 100 ft. long, and one, 9 ft. shell diameter by 100 ft. long, with a daily capacity of 1500 to 2000 tons of nodules. Numerous modifications of this process have been developed which show good effects. Analysis of nodulized Mayari ore is as follows:

#### Mayari Nodules Dried at 212 Deg.

Fe	H <sub>2</sub> O	SiO <sub>2</sub>	Al <sub>2</sub> O <sub>3</sub>	Mn	P	Cr	Ni	S
56.53	2.14	4.11	12.89	0.71	0.018	2.04	0.93	..

Following is a comparison of screen tests made on Mayari nodules produced in Cuba on the old basis; 10 per cent. through 40 mesh (1); coarse nodules produced in Cuba (2); Lime nodules which come up to the new standard of 75 per cent. on 10 mesh (3); and typical Lake ores.

	On 3/4 in.	No. 2	No. 8	No. 20	No. 40	No. 60	No. 80	No. 100	Thru 100
(1) Fine Mayari Nodules	4.70	2.40	31.80	25.50	21.53	6.76	2.95	1.16	3.20
(2) Coarse Mayari Nodules	8.75	4.15	44.42	22.34	13.31	3.45	1.46	.49	1.63
(3) Coarse Lime May. Nodules	28.45	10.98	41.15	11.75	5.35	1.02	.43	.10	.77
(4) Mesaba	25.40	26.86	12.54	10.86	6.92	2.76	3.34	11.33	
(5) Old Range	30.16	30.76	15.01	8.14	4.16	2.06	2.74	7.01	

NOTE:—On account of use of different screen scale, for comparative purposes, 10 mesh screen used in our tests is counted No. 8, as used by Mr. Brassert.

The question immediately arises as to why flue dust loss with fine Mayari nodules is so much greater than with the relatively finer Lake ores. This is probably explained by the fact that the nodule particles are more free and granular than in the Lake ores and no doubt they retain this condition to a greater depth in the furnace due to the absence of any great amount of carbon deposit in the upper zones of the furnace. From laboratory experiments made by passing blast furnace gas over samples of Mayari nodules and "Admiral" Lake ore under identical conditions of temperature, showed maximum carbon deposit of 157 per cent. at 450 deg. C. with "Admiral" ore against a maximum carbon deposit of 0.7 per cent. at the same temperature with Mayari nodules. This condition is perhaps somewhat modified in the blast furnace, yet it is possible that it affects the tendency of the two ores to pass off in the gas as flue dust.



## SINTERING

A considerable tonnage of Mayari ore in the natural state has been sintered in the Greenawalt pans by admixture of furnace flue dust which furnished the combustible material, but up to the present time, the sintering of this ore with the addition of coal, coke, or other straight fuel has only been conducted on an experimental basis. Mixtures of anywhere from  $\frac{1}{4}$  flue dust (15 to 18 per cent. carbon), with  $\frac{3}{4}$  raw ore, down to  $\frac{3}{4}$  flue dust with  $\frac{1}{4}$  raw ore have given good results. Eight to 10 per cent. of fine anthracite coal, culm or coke breeze mixed with the ore gave a good sinter when tried experimentally. Bituminous coal did not work satisfactorily as the hydro-carbons, tar, etc., volatilized from the coal in the burning portion of the charge condensed in the pores of the cold and wet portions, thereby closing up the air passages and causing dead unsintered spots. The sintering process promises to prove to be the most efficient means of preparing Mayari ore for the furnace.

## BRIQUETTING

Attention has been paid to application of the Mashek briquetting machine to the treatment of raw Mayari ore. This machine in its present form consists essentially of two corrugated rolls, with the corrugations running parallel to the axis of the rolls, on the surface. These rolls are held together by powerful springs which serve to exert pressure on the ore as it is fed between them. Pencils of compressed ore approximately 12 in. long and  $1\frac{1}{2}$  in. in diameter result, and it is hoped that these will hold together till they pass down into the furnace, or if they do break will not produce fines. Of course, this material will not stand weathering and consequently will have to be charged directly from the machine into the furnace. Since the cost of mining of Mayari ore is so exceedingly low, any means by which the ore may be successfully prepared for use in its natural state is sure to prove attractive, more particularly as it may be found that the ore in its natural condition is best suited for reduction in a blast furnace.

## COKE

To my mind, the inferior coke heretofore available in carrying on the furnace operations has proved to be the greatest stumbling block in the way of satisfactory progress, sharing in importance the question of size of nodules. The Maryland Steel Company was forced to use in its furnaces coke from an obsolete by-product coke plant—one of the first of its kind built in this country.

At Steelton, oven operating conditions were what could be expected with a modern Semet-Solvay coke plant, but the character of coal supplied to the ovens resulted in a coke of varying ash and sulphur content. The physical structure was weakened by layers of slate forming fracture planes and this resulted in excessive quantities of coke breeze.

As a consequence of the use of raw coke and coke containing worthless breeze, exceedingly high blast pressures resulted. Coke dirt scaffolds formed, and then at intervals would slide in great masses into the furnace hearth. The furnace required continual checking to prevent heavy slips. When the already fine state of the stock column due to the coke was further aggravated by the use of fine Mayari nodules, the furnace conditions would grow worse. Under the circumstances it was perhaps only natural that an undue share of the furnace troubles was attributed to Mayari ore. In other words, the extremely fine condition of the stock column, due to both fine dirty coke and fine

Mayari nodules, has been the cause of high pressures, loss of tonnage, increased fuel consumption and practically all the other bad effects which were experienced on high percentage Mayari mixtures.

Certain developments of the last few months have cleared the horizon both at Sparrow's Point and at Steelton. Due to business conditions, all furnace operations were suspended at the former plant in January, 1914, and at that time also the old coke plant passed out and has been dismantled. Operations were resumed in March, using a high grade Connellsville coke. Since then normal pressures, exceptionally good fuel consumptions and tonnages and ideal furnace operations have been the rule.

Following are some records of No. 2 furnace, Maryland Steel Company, under both conditions—with old by-product coke and with Connellsville coke:

	Old Coke			Connellsville Coke		
	Sept., 1913	Oct., 1913	Nov., 1913	Mar., 1914	Apr., 1914	May, 1914
Average daily tonnage	316	329	302	337	427	436
Average daily fuel ratio	1.18	1.14	1.13	1.22	1.01	0.98

Much of the good record of April and May, 1914, is no doubt attributable to the use of coarser nodules than had previously been used. That the size of the nodules is an item of great importance is borne out by practice on 100 per cent. nodulized Cornwall concentrates at Lebanon. On this ore of a character entirely different from Mayari, it is an established rule that fine nodules result in retarding the traveling of the furnace, in abnormal blast pressures and in reduced outputs of iron.

During this same period, at Steelton, a coal washing plant was completed for the purpose of removing slate and sulphur from the coking coal. This plant began operations in March, 1914, and at once the quality of coal resulting was such as to give an excellent coke in the ovens. The washing plant has a capacity of approximately 1500 tons washed coal in 10 hours. The analysis of the Penn-Mary coals, coke from unwashed coal, washed coal and coke from washed coal are as follows:

	Vol., etc.	Fixed C.	Ash	S.
Penn-Mary coals	25.00	65.63	9.37	1.00-2.00 (Av. 1.80)
Coke from unwashed coal, aver. for year 1913	1.29	86.07	12.64	1.33
Washed coal	27.51	66.17	6.32	0.96
Coke from washed coal	0.89	90.35	8.76	0.86

The coke resulting from washed coal was of exceptional character physically as well as chemically, being strong and tough with a splendid open cell structure. Following are results of some physical tests made on washed and unwashed coke, showing slight decreases in specific gravity and correspondingly slight increase in size of cells, due to washing coal:

	Unwashed Coke	Washed Coke
Specific gravity apparent	.972	.935
Specific gravity real	1.812	1.798
Per cent. cells	46.96	48.31
Per cent. walls	53.04	51.69

The Penn-Mary Coals are naturally good coking coals and make splendid coke when the sulphur and ash are within reasonable bounds. This is no doubt the reason that such a slight difference is noted between the washed and unwashed coals.

## LIMESTONE

A local dolomitic limestone, which for Lake ore practice would be considered of a very low grade, suits the Mayari practice splendidly at Steelton. It analyzes approximately 3.5 to 6 per cent.  $\text{SiO}_2$ , 69.5 per cent.  $\text{CaCO}_3$ , and 25 per cent.  $\text{MgCO}_3$ . In Cuban ore practice it has been found that 9 to 10 per cent.  $\text{MgO}$  in the slag is very beneficial. At

Sparrow's Point a mixture of half calcite and half dolomite is used to obtain this condition. When calcite alone was used trouble was experienced with foamy cinder and heavy slag runners. All stone is crushed to go through a 6-in. ring and the fines are removed.

With ideal coke available and with a new standard established for the coarseness of Mayari nodules, a splendid opportunity presented itself for the settlement of some of the points about which questions seemed to exist. By eliminating all the variables possible, the field was opened for study of slag conditions, internal working of furnace and other items which might be demonstrated. With this object in view, an elaborate series of tests was begun in March, 1914, on No. 1 furnace at Steelton.

#### TESTS ON NO. 1 FURNACE, STEELTON

To be sure, this furnace is small, being 9 ft. 6 in. hearth, 15 ft. bosh, 11 ft. stockline, 65 ft. high; yet for experimental work it presented decided advantages. Tests of longer duration could be run on smaller tonnages of materials, and since most of the ore was especially prepared this was quite a considerable item. It might be argued that results attained on this small furnace would not be comparable with those to be expected on a larger furnace. To meet this argument we have previous history giving comparative performances of this small furnace and larger ones on other mixtures with conditions approximately alike. From earlier experience it is fair to assume that this small fur-

17 days' run—washed coke—\$1.25 per cent. coarse Mayari nodules.  
6 days' run—washed coke—3 per cent. lime nodules.  
10 days' run—washed coke—high lime nodules.  
14 days' run—washed coke—screened nodules.

This takes us up to date (May 20) and the tests are to be continued approximately as follows:

10 days' test—washed coke—\$1.25 per cent. sinter—Mayari and flue dirt.  
10 days' test—washed coke—\$1.25 per cent. Mashek briquettes.  
10 days' test—washed coke—\$1.25 per cent. partly dried raw ore.

Some of the points deserving especial mention as shown on the charts are:

Sudden clearing up of entire situation when change was made from unwashed coke and fine nodules, to washed coke and coarse nodules, with increased product, improved yield of iron from ore, drop in fuel ratio, drop in percentage of stone to ore, reduction in flue dirt produced, remarkable drop of 3 to 4 lb. in blast pressures, increase in nickel content of pig iron, drop in sulphur content of pig iron and the establishment of extremely regular, uniform furnace conditions with complete absence of any slipping or hanging. The high alumina and high percentage of acids in the slag may be of interest.

A summary of the average results from each test is tabulated herewith, together with the data for the month of December, 1908, when No. 1 furnace made a record tonnage on a mixture of 75 per cent. Lake ore and 25 per cent. Daiquiri.

	Dec. 1908, lake ore	75 per cent. fine nodules & un- washed coke	\$1.25 per cent. fine nodules & un- washed coke	Coarse nodules & washed coke	3 per cent. lime nodules & washed coke	7-9 per cent. nodules & washed coke	Lime screened nodules & washed coke
Product—tons	170.43	91.76	98.98	157.10	150.08	156.29	158.58
Actual yield, per cent.	.52	.51	.49	.59	.57	.58	.61
Theoretical yield, per cent.	.....	.59	.59	.605	.596	.581	.62
Fuel ratio	1.15	1.43	1.49	1.15	1.18	1.15	1.13
Stone, per cent. of ore	.....	.46	.46	.35	.33	.30	.38
Flue dirt, per cent. of ore	.....	.....	9	6	5.2	1.4	2.6
Blast temperature, deg. F.	735	1027	985	873	832	820	816
Blast pressure, lb.	10	8.5	10	8	8	7.5	8
Cubic feet air per minute	21,504	16,212	18,122	20,482	20,580	20,580	20,580
Chromium in pig iron, per cent.	.....	2.09	2.28	2.08	2.07	2.14	2.29
Silicon in pig iron, per cent.	.....	1.48	1.40	1.06	1.01	1.07	1.24
Nickel in pig iron, per cent.	.....	0.95	1.04	1.24	1.19	1.07	1.19
Sulphur in pig iron, per cent.	.....	.043	.072	.041	.027	.039	.025
Sulphur in coke, per cent.	.....	1.07	1.30	0.77	0.81	0.80	0.87
Ash in coke, per cent.	.....	13.92	11.38	8.54	8.79	8.91	8.84
Sulphur in slag, per cent.	.....	2.60	2.31	1.82	1.97	1.97	2.04
SiO <sub>2</sub> + Al <sub>2</sub> O <sub>3</sub> in slag, per cent.	.....	46.60	50.08	51.82	52.22	52.95	54.07
SiO <sub>2</sub> in slag, per cent.	.....	25.70	24.11	22.58	24.19	23.81	24.30
Al <sub>2</sub> O <sub>3</sub> in slag, per cent.	.....	20.90	25.97	29.25	28.03	29.14	29.76
CaO + MgO in slag, per cent.	.....	49.76	.....	45.36	46.00	44.61	43.95
CaO in slag, per cent.	.....	40.10	.....	37.44	37.51	36.68	35.94
MgO in slag, per cent.	.....	9.66	.....	7.92	8.49	7.93	8.00
Ore on 10 mesh, per cent.	.....	.....	35.29	57.32	63.65	80.58	74.90
Ore through 40 mesh, per cent.	.....	.....	15.50	7.10	5.30	2.24	6.47
Flue dirt through No. 10 on No. 20, per cent.	.....	.....	8.18	18.13	23.45	16.73	6.22
Flue dirt through No. 40, per cent.	.....	.....	60.75	28.83	19.77	22.09	36.61
Top pressure, inches water	.....	.....	.....	1.2	1.25	1.14	1.17
Top temperature, deg. F.	.....	.....	.....	249	275	272	286
Moist. grains per cu. ft.	.....	2.7	3.5	2.5	4.0	3.6	4.7

NOTE:—In slag analyses, the per cent. of CaO shown is slightly in error insofar as it includes the Ca as CaO which is combined with the S to form CaS.

nace will run from 200 to 250 lb. higher on fuel consumption than one of the 300-ton furnaces. This is due chiefly to small size and uneconomical lines and partly to the fact that the capacity is limited by lack of stove capacity and to the antiquated methods of filling. On the other hand, the flue dirt production would be but half that of a 300-ton furnace.

After the blowing, on March 16, 1914, the furnace became fairly well straightened out on March 21, when, with unwashed coke, 75 per cent. of fine Mayari nodules was put on the furnace for two days (see supplemental plate). Then the schedule of tests continued as follows:

2 days' run—unwashed coke—75 per cent. fine Mayari nodules.  
5 days' run—unwashed coke—\$1.25 per cent. fine Mayari nodules.

#### NO TROUBLES WITH THE SLAGS

During the entire run, the physical condition of the slag has been excellent. After flushes and casts, the runners contained practically no cinder, all having drained clean. The slag was invariably hot and exceptionally fluid. With silica plus alumina about 52 per cent., composed of approximately 29 per cent. alumina and 23 per cent. silica, good results were obtained. In fact it developed that variations in alumina from 27 to 33 per cent. and in silica from 20 to 25 per cent. had no apparent effect on the operation of the furnace. To me the matter of slag temperature appeared far more important than chemical composition. Our excellent coke gave an intensely hot hearth and no difficulty

(Continued on page 1443)

# Colombia's Resources and Possibilities

Its Natural Riches and Prospective  
Trade Large—Railroad Building a  
Vital Need—The Oil Concessions

BY CHARLES M. PEPPER\*

CARTAGENA, COLOMBIA, May 20, 1914.—Colombia lies close to the United States, so close that American business men sometimes overlook it entirely in their survey of South America. It has vast undeveloped resources, and as a prospective market no one can measure its possibilities. Taking its Caribbean coast, New York and New Orleans are at its front door. Or the case might be put the other way by saying that the Colombian ports of Cartagena and Barranquilla are the front doors of our Atlantic ports. Entering through them the possibilities of a large section of Colombia are disclosed. There is also the banana port of Santa Marta.

## A GEOGRAPHICAL OUTLINE

Cartagena and Barranquilla are the commercial mouths of the Magdalena River, and the Magdalena, for nearly 1000 miles, is the great central trade artery of Colombia. Much of the commerce of the interior in and out is carried in the flat-bottom side-wheel boats not exceeding three and a half feet draft, because the channel of the Magdalena is so shallow and shifting that a deeper draft is impracticable. The boats are something like those formerly seen on the Ohio river. They used to be made in the United States by shipyards which provided the Ohio river boats of this type, but German competition came in and has displaced this source of supply. Banana cultivation, of course, is limited to the low coastland, but coffee, minerals and various tropical products are floated down the Magdalena.

Part of the Magdalena commerce is fed by the Cauca river which flows into it 200 miles above seaboard. The Cauca traverses a rich agricultural section. It has steamboats, but they are of even

\*This is the concluding article of a series in *The Iron Age* by Mr. Pepper based on a tour of South American states. The previous countries treated of were as follows: Peru, November 13, 1913; Chili, January 1 and February 5, 1914; Argentina, March 5, 1914; Brazil, April 2, 1914, and Bolivia, May 7, 1914.

lesser draft than the boats on the Magdalena, and much of its commerce is by means of canoes and rowboats.

Six hundred miles from the mouth of the Magdalena is Honda, whence the mountain road leads to the capital at Bogota. This road was built in the time of the Spanish conquerors by Indian labor. It was a formidable undertaking then, and would be a formidable one to-day. Formerly, practically all the traffic to and from Bogota was carried over this road by pack trains of mules. The Colombian Government finally succeeded in getting a railway line constructed from Bogota to Girardot on the upper Magdalena, 100 miles above Honda. At the latter place a transfer can be made to boats whose draft does not exceed two and a half feet. This is convenient for travelers who do not like the prospect of three days on the back of a mule over the road from Honda to Bogota, but for traffic it is inconvenient to make the transfer and then to transfer again at Girardot to the railway, so that a large proportion of freight is still carried by the pack trains.

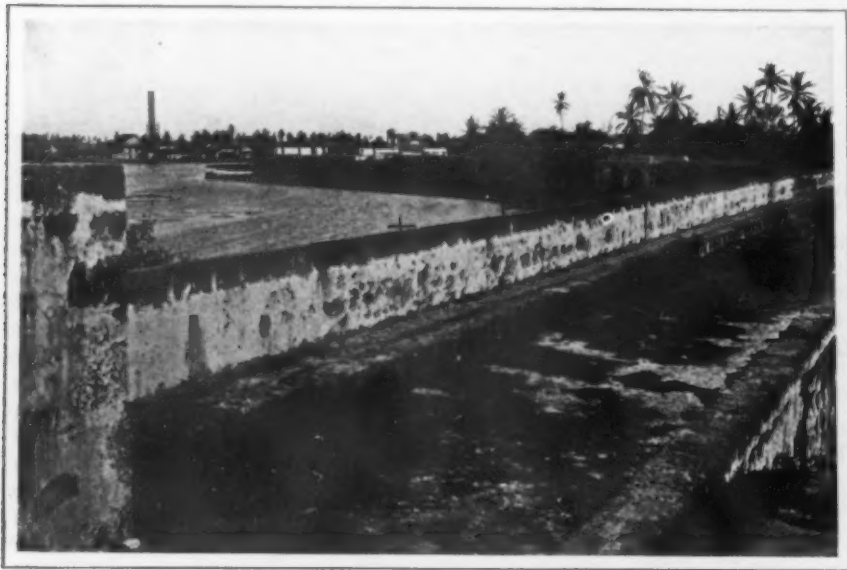
Two hundred miles below Honda is a river landing known as Puerto Berrios. A railway starts here for Medellin, the capital of the state of Antioquia, which is the chief mineral state of Colombia. The railway has pushed towards Medellin very slowly, but it is so close now that it may almost be said to be there, furnishing a very important rail feeder for the Magdalena. Medellin itself is an enterprising city of 50,000 to 60,000 and is the center of a considerable commerce.

Coming back to the Caribbean coastline, there is the Darien country, of which the Atrato river is the artery. The Atrato commerce is fed from both Cartagena and Colon. Two hundred miles up the Atrato is the important commercial center known as Quibdo. This is not a very large town, possibly having 3000 inhabitants, but its trade is large. The place is important enough to have a United States

consular representative stationed there.

Colombia also has an extensive Pacific coast frontage. When the canal is opened this may be considered as a prolongation of our Atlantic coast line. An important commerce direct with the Pacific coast section is certain. There are only three or four small ports here, the most important of which is Buenaventura. A railway is slowly being built from Buenaventura across the coast range of the Andes to Cali, an important town at the lower end of the Cauca valley. There is a fair amount of trade in this region now, and it is sure to be materially increased.

I have given this geographical outline of Colombia be-



Harbor Front and Old Seawall at Cartagena, Colombia





A Vista of Honda, Colombia, on the Magdalena

cause it is desirable that the general features of a country so important to the United States should be understood. A glance at a map will enable any one to understand the situation as to commerce and markets.

#### THE NATURAL RICHES UNEXPLOITED

Colombia is almost an unexploited country as to its natural riches. These are both mineral and agricultural. The mineral possibilities perhaps are exaggerated, because that is the tendency when there is little definite information of a trustworthy character. Yet mineral resources may be underestimated.

Coal is found in various sections. There is said to be one important deposit in the neighborhood of Rio Hacha, which is tributary to the port of Santa Marta. Another is reported to exist in the territory along the Magdalena, where there is a river landing known as Banco. Coal also has been found in the valley of the Sinu, a river which is reached from Cartagena. Pacific coast deposits have been made the subject of more careful technical examinations than those in other sections. A big American coal company had its engineers there a few years ago. They confirmed the existence of the coal, but there were certain drawbacks on the commercial side, including the lack of transportation. Transportation, in fact, is going to be the chief factor in developing Colombia's coal resources, because the available coal fields are isolated and must have railways before they will be worth exploiting.

Iron ore exists in the region known as Upper Cundinamarca, where the city of Bogota is situated. There is a rock formation of fine grain sandstone, shale, iron ore, and shale overlaid by coal and limestone. It is claimed that masses of iron ore, containing 50 per cent. iron, have been found. Bogota has a small iron foundry, and in several localities the ore and

the coal are close enough together to be assembled for domestic industry, but beyond this Colombia, for half a century or more, is not likely to have iron and steel industries.

#### THE PETROLEUM RESOURCES

Petroleum is now looked upon as one of the most promising mineral products. Its existence in the regions around Cartagena and Barranquilla has been known for several years, while its presence is suspected in the lower Sinu basin and around the mouth of the Atrato river. Crude boring was done and a few wells were in operation when oil prospectors both in the United States and Europe began to take notice of the Colombian petroleum prospects. It

might be guessed that the Standard Oil Company was not ignorant of the situation, although no publicity was given to its investigations. Some practical oil men from Beaumont, Texas, interested themselves, and then a Canadian company, which included some prominent personages, was formed.

The appearance of an English political leader, Lord Murray, as an oil prospector was the sequel to the reports of Colombia's petroleum resources. Lord Murray was merely the representative of Lord Cowdrey, whose extensive holdings of Mexican oil lands have made his firm, the Pearsons, a factor in the Mexican political situation. The Pearson firm, whether undertaking engineering contracts or anything else, operates on a large scale. Lord Murray, for his principal, obtained from the Colombian government sweeping concessions for the exploitation not only of the petroleum resources, but for about everything else that the country had in the way of natural wealth, including also valuable railway concessions.

Possibly the Colombian congress would have ratified these concessions, but more probably it would not have done so had there been no outside



Rafting Lumber on the Banks of the Magdalena

influence. But it was common report that Secretary Bryan took a plunge into dollar diplomacy, and that representations were made to the Colombian government of the inadvisability of granting such sweeping concessions to European interests, especially in view of the responsibility which the United States has in connection with the Panama Canal. Practically mortgaging the country con-



Mountain Railroad Construction in Colombia

tiguous to the Canal to European capitalists, it was thought, would be bound to cause grave international complications in the future. Besides, disguise it though we may, the United States has paramount commercial interests as well as political responsibilities in the countries adjacent thereto.

In the diplomatic representations that may have been made no reflection was cast on the good faith of Lord Cowdrey, or on the ability of himself and his associates to obtain the capital necessary to carry out their projects; but the question of American national policy was the main one, and Lord Cowdrey quietly withdrew. This does not mean that he and his associates may not be interested in developing the Colombian oil resources. They will not be able to do it, however, on terms which give them advantages over other capitalists, especially American.

#### GOLD AND PLATINUM

Developed mineral resources of Colombia are chiefly those of the precious metals. The mineral belt is west of the Magdalena river and extends clear to the Pacific coast. In the various mining districts of Antioquia there is both quartz and placer mining. It has been remarked that the English companies show a preference for quartz mining and the Americans for placer mining. In the Porce river district are a number of hydraulic plants operated by American companies.

Placer mining finds its most inviting field in what is known as the Choco region, the outlet for which is the port of Buenaventura on the Pacific. The Indians of the Choco by the most primitive

methods worked the placers and obtained considerable quantities of gold. The necessity of dredges was apparent to the English and the American companies which prospected the region. Large sums have been spent to obtain dredges which would answer the peculiar conditions of these Choco placers, and this region continues to afford a profitable field for improved dredging machinery. In average years Colombia can count on a gold production of \$4,000,000 to \$5,000,000. With the capital which is now being invested in mines on the strictly business basis that is followed, the total output should be materially increased.

Platinum is one of the mineral products of Colombia, yet little definite information is to be obtained regarding the probable extent of the deposits. It is found chiefly in the Atrato region, and most of it is handled at Quibdo. The platinum is obtained by the most primitive methods of washing, usually the work being done by the Indian women who wash the sands of the bars and river beds. In one year there was a reported production of 14,000,000 oz., the value of which was placed at \$260,000.

#### AGRICULTURAL DEVELOPMENT IMPORTANT

The future, under stable political conditions, is likely to show a steady increase in Colombia's mineral production, yet the development of the agricultural resources is more important to the growth of the country as a market for manufactured products. There are still abundant timber resources, especially in the Darien region, but the cattle grazing and the wheat raising possibilities of the great central plains are of greater consequence. American traction engines, plows and cultivators are in demand so far as the limited agriculture requires any improved farm machinery. The same statement may be made as to harvesters. These are found in the agricultural district around Bogota, and in other sections where Colombian land owners are progressive.

Mining machinery, of course, has a market. The demand for electrical appliances is increasing, and in some sections the roads are good enough to encourage the importation of motor cars, though this never is likely to be a big business.

#### FUTURE DEPENDENT ON RAILROAD EXPANSION

Colombia's possibilities as a market are really dependent on the construction of a network of railroads, and railroad construction in the Andes is a costly proposition. Nevertheless, the government for years has tried to have a comprehensive railroad policy which will ensure it a system adequate to its needs. At present nearly all the railroads are independent of one another, and therefore are not mutual feeders. They merely serve local needs.

A railroad paralleling the Magdalena river would be the greatest single blessing that Colombia could obtain. The river never can be made navigable for craft of greater draft than that which is now in use, and the expense of river improvements, if they were attempted, in a few years would exceed that of the construction of a railroad. The upper Magdalena is now paralleled by a rail line, and the whole of that region shares in the benefit. But what is needed is to prolong the line down the banks to Barranquilla. Construction through the tropical forests and the plains would not in itself be a difficult engineering proposition. The real problem would be to maintain the railroad during the rainy season when floods and washouts would have to be guarded against, but the commercial advantages would be so great that the expense would be justified.

The Pan-American Line is another prospective railroad which would add greatly to the development of Colombia. It is part of the general scheme of an intercontinental trunk line all the way down the Andean region of South America. Very full reports were made on the Pan-American project 15 years ago by engineers under the international commission, of which the late A. J. Cassatt, of the Pennsylvania Railroad, was chairman.

A step towards realizing the Pan-American project was taken by the government of Colombia some years ago when it granted a concession to some Americans for building a line from a point on the Gulf of Darien, or Uraba, to Medellin. Some capital was obtained, and a short line was built from the sea into the swampy lowlands with a view to utilizing the timber resources of that district and then extending the line gradually. Lack of further capital caused the project to be abandoned before the timber could be tapped.

Recently the Colombian government has again taken hold of the project. The purpose is to make it a national enterprise, the federal government co-operating with the Department of Antioquia. Engineers representing both the nation and the Department of Antioquia are to make a preliminary survey. Then if Antioquia decides to construct the road to Darien Gulf, the national government is to grant a subvention of \$25,000 per mile, and also to cede about 400 acres of public land for every mile constructed. If Antioquia does not make use of this privilege the federal government is authorized in conjunction with the department to make a contract with a company formed for the purpose of constructing the line. If neither of these measures leads to the construction of the road, the national government will proceed to build it in the briefest time possible, for which it is authorized to obtain a loan.

I have given this summary of the recent action of the Colombian congress because many competent engineers approve the project of a railway from Medellin to the Gulf of Darien, and foreigners who want to assist in developing the varied natural resources have confidence in it as a commercial enterprise. Colombia is also in a modest way seeking to improve its port facilities, and there are occasional contracts to be had for supplying material for such work.

#### CURRENCY SYSTEM NEEDS REFORMING

Before the country can advance very far in its various plans for internal development the currency system will have to be reformed. At one time Colombia had a stable currency of gold and silver. Then came revolutionary disturbances and the temptation to issue paper money was too strong to be resisted. There is no need of going into the details of the various paper issues, or of trying to determine just how much of the paper promises to pay have been put out. For practical business purposes it is enough to know that after fluctuations of the wildest character, extending through the last 10 years, exchange is now on a comparatively settled basis at the rate of 100 Colombian dollars to one dollar of the United States. In the Choco region this paper currency does not circulate, the inhabitants there insisting on silver, but in the rest of Colombia it is accepted and is the only medium in circulation.

Various plans have been proposed for reforming the currency and getting the country back to a normal monetary standard. Most of them include a central bank. Doubtless a satisfactory scheme in time will be adopted, but no one can say how soon

some stable arrangement can be brought about.

#### TRADE WITH THE UNITED STATES

The United States has a fairly good share in the trade of Colombia, and in the future will have a larger one. It furnishes an excellent market for the coffee, bananas, hides and miscellaneous products. Coffee is the largest export. In some years the exports to the United States amount to \$10,000,000, and in other years they drop to \$5,000,000, dependent upon the price and the supply from other sources. The banana crop which the United States takes in ordinary years may be placed at \$1,000,000.

The purchases from the United States include all kinds of machinery and iron and steel products. The prospective increase in the importation of these products must be judged by the general development of the country, including railroad construction.

#### A Rotary Small Tube Swaging Machine

The Waterbury Farrel Foundry & Machine Company, Waterbury, Conn., has brought out a line of standard rotary swaging machines which are built in several sizes for handling round rods and tubing ranging from  $\frac{1}{4}$  to  $1\frac{1}{2}$  in. in diameter. These machines are employed in rod and tube mills



A Rotary Swaging Machine for Pointing, Reducing and Shaping Round Rods and Tubing Ranging from  $\frac{1}{4}$  to  $1\frac{1}{2}$  In. in Diameter by the Cold Process

for pointing material preparatory to drawing through the dies on a bull block or draw bench and are being used extensively in the manufacture of staple articles in the metal trade, such as hose nozzles, tapered shells, screw and bolt work, shanks for tools, etc. Another use is by manufacturing jewelers for reducing a bar or ingot of pure or plated metal to a small

size suitable for drawing on individual blocks or continuous wire-drawing machines.

The construction of these machines is simple and is intended to stand up under severe operating conditions. In designing the machine an effort was made to have the dies and working parts of the mechanism readily accessible. In the operation of these machines a series of very rapid compressions is imparted to the rod or tube by a pair of half section die blocks, which at the same time have a rotary motion around the work that is relied upon to eliminate the possibility of any fin or burr.

The use of safety goggles recently saved the life of an employee of the Valley Iron Works, Williamsport, Pa., in the case of a bursting emery wheel. According to a letter from Percy H. Squier, superintendent, to the Julius King Optical Company, a fragment of the wheel weighing about 3 lb. and traveling at a speed of 40 to 50 miles per hour struck the operator squarely between the eyes, forcing the framework of the goggles into the man's head. The glass apparently was driven forward, due to the way the rims were designed, and although the man was seriously injured, his eyes were unharmed.



## A LARGE PLANING MACHINE

### A Massive Tool of the Standard Type with a Readily Removable Outer Housing

A large convertible open-side planing machine has recently been built by the Detrick & Harvey Machine Company, Baltimore, Md. It is designated as the 8 x 11 x 24 ft. size, and will be installed by the Isthmian Canal Commission in the permanent machine shop at Balboa, C. Z. It is driven by a direct-connected reversing motor and several novel features are embodied in its construction. Some idea of the massiveness of the machine can be obtained from the accompanying illustrations which show it completely assembled in the builder's shop.

The machine has a main housing at the right side and an outer one on the left which is adjustable toward and away from table and is arranged so that it can be readily removed. When this is done the cross rail is run back in its housing and the machine is operated as an open side tool on work that will not pass between the housings. The bed is a massive iron casting and has two V-ways spaced 70 in. on centers, one on each side with a flat way between them. There are six longitudinal vertical ribs that extend the full length of the bed under the ways and are tied together at short intervals by double web girts of box section. The main housing has a bearing 40 in. deep and 102 in. long on the bed and is securely tongued and bolted in place. The finished surfaces are machined vertical and parallel with the ways. The bed for the outer housing is securely fastened with bolts to the side of the main bed and the upper surface is fitted with T-slots for attaching the housing base.

The box type table is machined and the way in which the guides are fitted in place is relied upon to keep it level in all positions. T-slots and numerous cored stop holes for holding the work are provided. It is emphasized that the construction of the table is such that chips cannot fall into the bed, but are removed from the side of the table. Two annealed

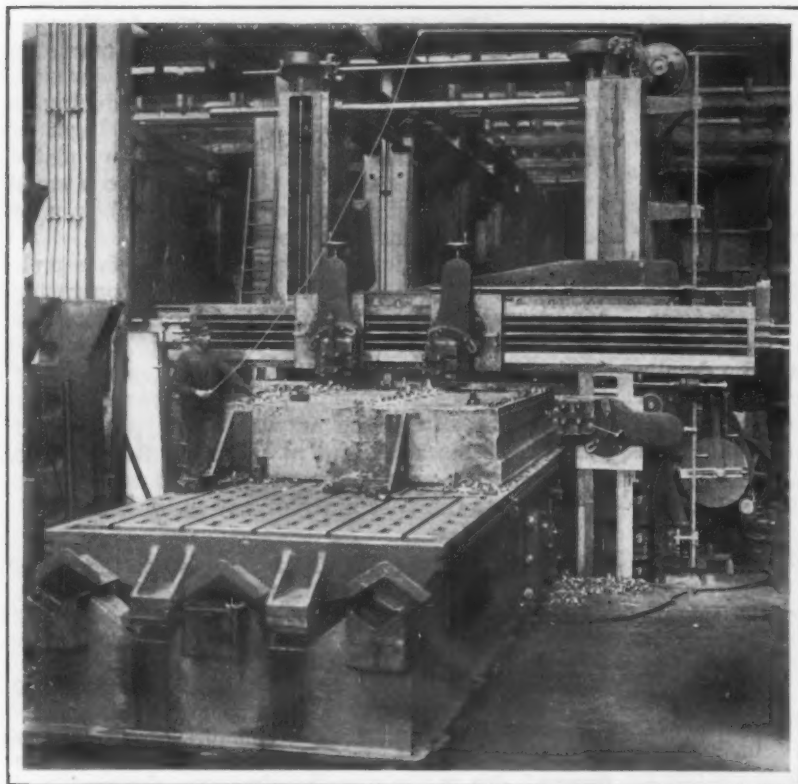
forged steel driving racks, each having a face 9 in. wide, are bolted and keyed into the table. Reversing stops, which can be quickly adjusted to give any desired travel within the capacity of the machine, are also provided.

The main housing is of massive rectangular box section. The lower end is carried down to the machine foundation and one side is fastened by bolts and tongued to the bedplate. Connections for attaching the cross rail housing and its braces are provided. The outer housing, which is of a curved box section and carries the outboard end of the cross rail, is supported on the auxiliary bed. The front vertical face is 20 in. wide and is machined to serve as a guide for the side head. A hand adjustment of 36 in. toward and away from the machine bed is furnished. When the cross rail and ties to the main housing are run clear, it is possible to remove the outer housing without difficulty so that work measuring more than 11 ft. in width can be machined. The cross-rail housing is a right angled casting attached to the main housing by the vertical leg and supporting the cross rail on the horizontal member. The bearing on the vertical leg of the main housing is 150 in. and provision is made for mounting one side head on this portion of the housing. A triangular strut casting extending 8 ft. back to the inner face on the rear end of the main housing and across the machine some 7 ft. braces the housing in the rear. The cross rail has a sliding fit in the housing to which it can be clamped securely and has a face of at least 24 $\frac{3}{4}$  in. for carrying the tool heads. The length is sufficient to enable either head to work the full planing width of the machine. A motor drive is installed to raise or lower the cross rail which can be run by hand through its housing to clear the outer one if it is necessary to operate the planer open sided.

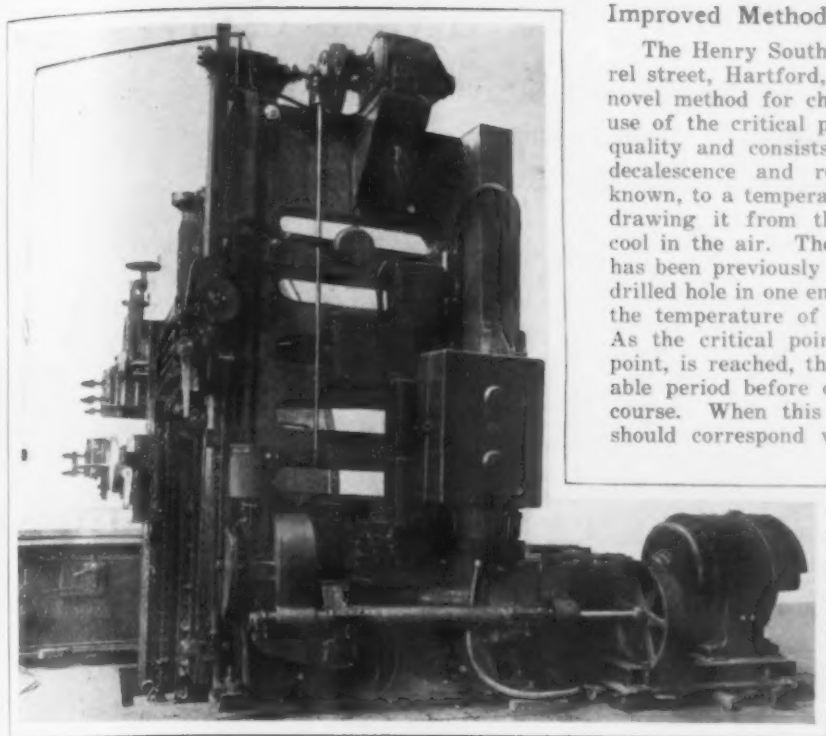
Four tool heads, located one on each of the two vertical housings and two on the cross rail, are provided, the latter being equipped for independent automatic feeds in all directions. They have a vertical power feed of from 0.0104 to 1 in. and an adjustment of at least 22 in., and permit quick adjustment to be made by hand. The horizontal feed of the heads is one-half the vertical. The weight of these heads is approximately 1800 lb. each.

The side heads have hand and power vertical traverse of 96 in. and a horizontal adjustment by hand of 22 in. and a feed range of 0.0208 to 1 in. They are counterbalanced and all four heads are arranged for simultaneous use on work of any width within the capacity of the machine.

The table is geared directly to the driving motor which is of the reversing planing machine type, no belting being used. A contactor panel and case, a master switch, two field rheostats, necessary grid resistances, pendant switch and a circuit breaker are included in the equipment and are mounted on the back of the main housing as shown. The cutting and return speeds can be adjusted independently of each other. The motor employed for raising and lowering the cross rail is a 220-volt direct-current



A Very Large Convertible Open-Side Planing Machine That Has Been Shipped to the Isthmian Canal Commission for Its Permanent Shop



The Driving Side of the Machine Showing the Push Button Control for the Motor and the Arrangement of the Apparatus

motor with reversing controller, the necessary resistances and a contactor connected to the controller so that the handle of the latter must be turned to the off position before the motor can be started after failure of the voltage. The reversing motor is coupled to a shaft that is geared to the two driving shafts, each of which has a phosphor bronze spiral pinion 21 in. long that engages a forged steel rack rigidly secured to the underside of the table. The cutting speed of the machine is from 20 to 30 ft. per min. and the maximum return speed is 60 ft. The cross rail is raised and lowered by screws that are geared to the motor supplied for this purpose. Power for the tool head feeds is also supplied by the cross rail elevating motor through a positive friction device that uses power only when the tools are being fed. The traverse movement of the cross rail is obtained by screws driven by hand. The cross rail, together with the table and tool heads, is equipped with suitable stops to prevent overrunning.

After the machine was completed it was given a test in the builder's shop which consisted of the simultaneous planing on three sides of a box shaped steel casting of about 3 ft. square and 12 ft. long, the four tools taking the maximum cut with the maximum practicable feed. A finishing cut was then taken on the three surfaces, and the piece was then turned over and the bottom finished. The specification requirement that the height and the width should not vary more than 0.001 in. was complied with. A second test was made with the machine operating as an open side tool. This test was the same as the previous one, except that in making the roughing cut only three tools were used.

Probably the largest single job of welding ever attempted in Wisconsin since modern welding practice was engaged in is the repair made for the Beloit Box-board Company, Beloit, Wis., by the Western Welding & Cutting Company, Milwaukee. Sixteen large cracks in the firebox of the largest boiler in the plant were welded and returned to service within 48 hours' time. Only two men were put on the job.

### Improved Method for Checking the Pyrometer

The Henry Souther Engineering Company, 11 Laurel street, Hartford, Conn., has developed a somewhat novel method for checking a pyrometer. This makes use of the critical points of blocks of steel of known quality and consists in heating a block of steel, the decalescence and recalescence points of which are known, to a temperature of 1500 to 1550 deg. F., withdrawing it from the furnace and permitting it to cool in the air. The fire end of the pyrometer, which has been previously heated to redness, is inserted in a drilled hole in one end of the test block, and the drop in the temperature of the test block carefully observed. As the critical point on cooling, or the recalescence point, is reached, the needle will hang for an appreciable period before continuing again in its downward course. When this occurs, the observed temperature should correspond with the recalescence temperature

furnished with each block. If the observed temperature does not agree with the proper recalescence point for the test block, it is, of course, apparent that the instrument is not reading correctly. The same temperatures for the decalescence and recalescence points will always be obtained, even though the blocks are reheated a number of times, and it is thus possible to use them over and over again for checking purposes without affecting the critical temperatures in any way. The test blocks are approximately 2½ in. in diameter and 4½ in. long, and it is stated that no special precautions are necessary during the cooling other than to avoid strong drafts.

### Greatest Coke Production

All records in coke production in the United States were broken in 1913, according to a statement by Edward W. Parker, of the United States Geological Survey, the output being 46,311,369 net tons, valued at \$128,951,430. This is an increase over the 1912 output of 2,327,770 tons in quantity and \$17,146,317 in value. Of the 1913 production 33,596,669 tons was made in beehive ovens and 12,714,700 tons, or 27.4 per cent., in by-product ovens. The increase in production of by-product coke was over twice as large as the increase in beehive coke.

The principal increase in by-product coke production in 1913 was in Alabama, where the gain was nearly 50 per cent.—from 1,349,797 net tons in 1912 to 2,022,959 in 1913. The increase in Pennsylvania was nearly one-third—from 1,974,619 tons in 1912 to 2,628,680 tons in 1913. Indiana showed an increase of 110,686 tons and Illinois of 94,609 tons.

A large part of the coal used in by-product ovens in States that do not produce coking coal was obtained from West Virginia mines. Mr. Parker estimates that the quantity of West Virginia coal made into coke outside of the State was 7,800,000 net tons. The quantity of coal made into coke in West Virginia was 4,034,251 tons and the quantity of coke produced therefrom was 2,472,752 tons. If all the coke made from West Virginia coal were credited to that State it would amount to about 7,750,000 tons.

The Aluminum Goods Mfg. Company, Two Rivers, Wis., is now running its plant exclusively in the production of army canteens, the War Department having contracted for 85,000 canteens on a 4000 per day delivery schedule. Until the contract is executed the Manitowoc plant will take care of other work in hand at Two Rivers. As already reported, the Manitowoc plant will be greatly enlarged during the last half of the year. The Two Rivers plant is operating two 10-hour shifts daily, except Sunday.

# Iron, Steel and Heavy Hardware Convention

Important Problems Discussed, Growing Out of  
the Relations of Manufacturers and Jobbers—  
Stevens Bill Indorsed—The Horse Shoe Situation

With a large attendance of both active and associate members, the fifth annual convention of the American Iron, Steel and Heavy Hardware Association was held at the Hollenden Hotel, Cleveland, May 26 to 28. In the three days several executive sessions were held, at which trade matters were discussed by the active members composed of the distributors, or jobbers, and there were open sessions in which the associate members, or manufacturers, participated. The association decided to take a more active interest in national affairs hereafter by creating a committee on public policy. Probably the most important trade matter that came before the active members was the horse shoe question, this topic being one of unusual interest because of a price reduction within the past few days. Some attention was also devoted to the discussion of bills pending at Washington, and action was taken in favor of legislation legalizing resale prices and providing for redress against distributors who do not adhere to such prices. The visitors were very hospitably entertained by the Cleveland people and particularly by their hosts, the Cleveland manufacturers. Various forms of entertainment were provided, both for the convention members and the ladies, so that practically every minute was taken up in business or in pleasure.

The convention began Tuesday morning with an open session directed by the president, C. M. Roehm, of Detroit. Responses to addresses of welcome were made for the active members by E. P. Sanderson, of the E. P. Sanderson Company, Boston, and for the associate members by Spencer Welton, Rutherford Rubber Company, Rutherford, N. J.

## President Roehm on Jobbers' Problems

President Roehm in his annual address spoke of the benefits of organization, declaring that statistics show that the lines of enterprise in the most demoralized condition are those which are unorganized and without the standard of endeavor which is fostered by cooperation. He urged greater interest in national matters and recommended that a committee on public policy be established. Early in its history the association had favored the elimination of direct shipments wherever possible, and at each succeeding convention this resolution had been re-endorsed. Not much, however, has come out of it. He believed that if manufacturers and distributors would try to put this into effect far-reaching benefits would follow. A great deal of time in the past year had been given to the consideration of the cost of doing business and the discussion should continue until its possibilities were exhausted. The subject of contract relations between jobber and manufacturer was spoken of as a burning issue. Among other things Mr. Roehm said:

Collective thought and action, without trespassing on the rights and privileges of the individual, are the tenets of the successful trade association.

National commercial organizations should interest themselves in matters of national concern. It is their manifest duty to ally themselves on some side of such large issues as the Interstate Trade Commission, price maintenance, one-cent letter postage and railroad rates.

## BUSINESS WANTS PEACE

Business wants to forget agitation and dissension. It wants undisturbed to devote itself to the execution of the acts which it is chartered to perform. \*\*\* Business big and little is ready to bow to the dictum of the modern view and only asks to be permitted to fulfill its obligations to its clients and stockholders without being hampered by unwise legislation, hysterical prosecutions and laborious efforts to unearth something which exists only in the imagination of some little legislator, who is trying to "shine bright" before his constituents. Peace—just peace—is the yearning desire of every industry in the land. Given peace and good crops and a new prosperity would spring into life, galvanizing into activity every section of this immense domain.

The American Iron, Steel and Heavy Hardware Association has no quarrel with the administration of our nation's laws. We are content to labor within permitted lines, believing that there is enough work to do along economic paths and that greater and more real good can accrue to the average business man through this channel, than came through privileges allowed under the old order.

## RESPECT FOR TERRITORIAL LINES

Faith in one's competitor; appreciation that every sober and well intentioned man is entitled to consideration; realization that the invasion of territory not contiguous ends in disaster for the invader and devastation of the district invaded—these are some of the things that come through the educating influence of commercial bodies like this.

## Business Sessions, Chiefly Executive

At the executive session Tuesday afternoon reports were made by the secretary-treasurer, John G. Purdie; by the Executive Committee, through E. W. A. Waterhouse; by the Spring and Axle Committee, through L. H. Williams, and by the Woodstock Committee, through R. R. Englehart.



E. W. A. Waterhouse, President-Elect





J. A. Gregg, First Vice-President

At Wednesday morning's executive session a short paper on the "Elimination of Unreasonable and Destructive Competition" was presented by L. H. Williams, Williams Hardware Company, Minneapolis, Minn., and was followed by some discussion. W. J. Dean presented the report of the Transportation Committee, W. R. Wilson that of the Pad and Mail Committee, and F. H. Butts the report of the Insurance Committee.

Wednesday morning's session, which was an open one, was given up to a discussion of "Contract Relations between Manufacturers and Distributors." This is fully reported elsewhere in this issue.

An interesting address, accompanied by stereopticon views, was delivered Wednesday evening by H. Russel Brand, New York, efficiency engineer and founder of the International Society for the Development of Business Control.

#### FLURRY IN THE HORSE SHOE MARKET

Probably the most important business matter that came before the convention in executive session was the horse shoe question. Its unusual importance was due to the fact that within a few days a leading horse shoe manufacturer had reduced prices and there was a possibility of a price war. The indications now are, however, that other manufacturers who have already met the reduced price and the manufacturer who first made it will hold to the new level. The report of the Horse Shoe Committee was presented during the executive session Thursday morning by J. W. McGinness, of McLain & McGinness, Pittsburgh. At the same session A. K. Edwards, Edwards & Chamberlain Company, Kalamazoo, Mich., reported for the Bolt and Nut Committee, and James A. Coe presented the report of the Iron and Steel Committee.

During the executive session the recommendation of the president for the creation of a Committee on Public Policy was adopted, and the new president will appoint such a committee.

The executive session closed Thursday with an interesting paper on the "Cost of Doing Business," presented by W. A. Kemmerer, Bittenbender & Co., Scranton, Pa.

#### THE STEVENS BILL INDORSED

At the open session Thursday afternoon the following resolution presented by Henry Bodevin, Brooklyn, N. Y., indorsing the Stevens bill legalizing the fixing of selling prices by manufacturers of package or branded articles to wholesalers, retailers and consumers, was unanimously adopted:

The American Iron, Steel and Heavy Hardware Association in convention assembled endorses with much earnestness and enthusiasm the aims embodied in bill No. 13,305 introduced in the House of Representatives by Mr. Stevens, of New Hampshire.

It is uncontrovertible that a manufacturer who has by years of work or by extensive advertising created a value for an article of commerce sold under a trade mark or a brand, ought to have a legal way of marketing his product in a profitable manner so that he may reap the just rewards of his enterprise. Provided always that the manufacturer of the commodity does not enjoy a monopoly.

It cannot be denied that a great wrong is inflicted on such a manufacturer if by the actions of unprincipled price cutters, who often use this valuable product as a leader to sell other goods, his business with his regular distributors is destroyed, because the article has become unprofitable to handle. Therefore, be it

Resolved that the members of this association, active and associate, be requested to do all in their power to induce their respective Senators and Representatives to pass this bill in the interest of general prosperity and business stability.

Resolved that in the opinion of this association the bill needs amendments in the following particulars:

It should provide for redress on the part of the manufacturers against a person selling goods at less than the established price.

It should permit the establishment of different prices in different parts of the country for the purpose of covering additional freight and other items.

It should further provide for definitions of the words "dealers at wholesale," "dealers at retail" and "the public," which words are used in the bill to distinguish different classes of the business community.

Resolved that two copies of these resolutions be suitably engrossed and mailed respectively to Mr. Stevens and to the Committee on Interstate and Foreign Commerce to which the bill has been referred.

#### THE NEW OFFICERS

Officers for the ensuing year were elected as follows:

President, E. W. A. Waterhouse, Waterhouse & Lester Company, San Francisco, Cal.

First vice-president, J. A. Gregg, Nicols, Dean & Gregg, St. Paul, Minn.

Second vice-president, Charles C. Lewis, Charles C. Lewis Company, Springfield, Mass.



John G. Purdie, Secretary-Treasurer

Executive Committee members for three years, Henry Bodevin, H. Langer & Sons, Brooklyn, N. Y., and E. F. Yarnelle, Mossman, Yarnelle & Co., Fort Wayne, Ind.

At a meeting of the Executive Committee John G. Purdie was re-elected secretary-treasurer. San Francisco was unanimously selected as the meeting place in 1915. Invitations were also received from New York, Toledo, Ohio, and Oakland, Cal.

#### Banquet and Entertainment Features

The social programme started with a dansant Tuesday afternoon, and during Tuesday evening the guests were entertained with an exhibition of fancy dancing. Wednesday noon the ladies were taken in automobiles to the Country Club, where luncheon was served; later they were given an automobile ride through the city. Wednesday afternoon was left open. Many of the visitors accepted the invitation of the American Steel & Wire Company to attend a moving picture talk on the process of making steel, given at the Coliseum, where an electrical exhibition was in progress. Others took part in a golf contest between the active and associate members at the Euclid Club. Quite a number visited the plant of the Standard Tool Company. Wednesday evening a very enjoyable musical entertainment was given at the Hollenden Hotel, fol-

lowed by informal dancing. The convention and social festivities closed with a banquet Thursday evening, which was attended by the ladies as well as the members.

The banquet speakers were William P. Palmer, president of the American Steel & Wire Company, H. P. Bope, vice-president and general sales manager of the Carnegie Steel Company, and John Kendrick Bangs, the author humorous. Attorney H. H. Johnson was toastmaster. Mr. Palmer talked at some length about the change in people's tastes and ways of living that have made the cost of living much higher than a few years ago. Referring to government prosecutions he remarked that it did not seem fair that because a few big business men get into pools and are indicted, all big business men should be blamed, any more than that all doctors should be blamed because one makes a wrong diagnosis. He predicted an advance in the present tariff rates before any further reduction is made, and declared that there is not enough popular expression in furtherance of the export business of this country. Colonel Bope said that the American people would not be kept down and that a revival of business is about due. Mr. Harding made a plea for the fair play for legitimate big business. He said we need less of legislative milling and more of commercial billing.

## Jobbers on the Keeping of Steel Contracts

### Some Considerations from the Standpoint of the Buyer and Manufacturers' Comments Thereon—Reform Seems Distant

Manufacturers and jobbers took part in a discussion on "Contract Keeping" at the convention of the Iron, Steel and Heavy Hardware Association at Cleveland last week. Some of the arguments always brought out in discussions of this subject at steel manufacturers' meetings were repeated. On behalf of the jobbers some new points were made. Samuel L. Sewall, Minneapolis Iron Store Company, Minneapolis, presented a paper under the title, "Contract Relations between Manufacturer and Distributer." In large part it is as follows:

#### The Jobber's Viewpoint

Suppose we take up a few types of contracts and generalize a little on each in turn. There is the contract between manufacturer and distributer, covering a line of goods having individuality and merit and in demand under well-known brands. Here we have a very enjoyable and satisfactory form of contract, one where the benefit is so apparent and so mutual that the relation will naturally continue so long as the conditions remain substantially the same. I am sure every buyer is glad to establish and maintain such relations and that the manufacturer is equally glad of such a connection.

#### EXCLUSIVE SALE

The exclusive sale of an article marketed under a brand of conspicuous worth and one in strong demand is surely a valuable feature of a contract. In return for it the manufacturer is entitled to the best efforts of his distributer to produce a desirable volume of business; otherwise there is not an adequate consideration for value received and therefore the contract will be short-lived. I believe in getting the agency for a strong line, holding it by vigorous sales effort, and satisfying the producer by the volume of orders that he has a first-class outlet for his goods.

Another valuable contract is that which covers a

broad class of staple goods—hardware, woodstock, horse shoeing supplies, or other line where the experience of years has proved to you the advantage of relying on one manufacturer for your supply. This advantage may not depend upon price, though, of course, it must include an average level of prices which is satisfactory; but it is more likely to be found in the grades furnished, the methods of handling your orders; in short, in all those factors which are included under the general terms of Quality and Service. I am glad to say that we enjoy the advantage and the satisfaction of a number of such contracts.

#### THE JUG-HANDLED CONTRACT

Now let us wade out where the water is a little deeper. Let us consider a contract, say for a million bolts, for specification within three or four months, at a fixed scale of prices, delivery and terms. Now, that is another story, as Mr. Kipling would say. The undoubted intent of contracts like this (for the purchase and sale of staple goods) was originally to enable the manufacturer to determine intelligently his wants of raw materials and get his supplies on hand in time to execute his orders; also to provide a steady run for his shop. On the part of the buyer it was to assure himself of a supply of goods at a favorable rate. Undoubtedly, too, these contracts were at first bona fide and were fully carried out on both sides.

Well, that can hardly be said to be the case today, can it? If the market price goes down, so also down goes the contract, through the voluntary revision of prices by the manufacturer; and if not by his action, then it surely sinks into the oblivion of the buyer's forgetting department and is "out of sight and out of mind."

But, let us say, the price goes up. As Myra Kelly would say, "Comes then Mr. Buyer" with liberal specifications, which he is surprised and pained to find overspecify his contract by two million or so, but which he assures the manufacturer he takes for granted will be

put in and completed at the contract price, in view of their many years of friendly dealing together, etc. Now, this description of a contract does not sound like a tower of strength and equity, standing four-square to every wind that blows, does it? But let us get up a little closer and examine the matter more in detail, hoping that we shall find after all a good honestly built tower with a foundation, at least, on bedrock, and fair to look upon from the right viewpoint.

Ought contracts to be made where the parties are in doubt as to their being carried out? In other words, ought the optional or jug-handled contract to be permitted, and does the practice of writing this kind of contract—I do not think practice is too strong a word—result in more injury to the manufacturers as a class, or to the distributors as a class? Which class is hurt the more, when a sharp advance makes operative such a contract? The manufacturer who finds himself swamped with unexpected orders, and at the same time finds his customer competing with himself for business, or the great class of distributors who regard the matter of contracts in a more conservative way—put in on a higher plane and who then find quotations made to the trade that are much too low compared with present costs, though netting a profit to the contract-holder? Are not the large producers already taking steps to eliminate the speculative contract? And with its removal will not the most serious criticism of the present-day contract be thereby removed?

#### ABOUT PRICE REVISIONS

Again, if the distributor is what this designation really implies, and if he has entered into the contract in good faith, and later is confronted with a decline in price which the manufacturer is unable or unwilling to meet, then is there really equity in the proposition that specifications should be furnished and the contract carried out regardless of the changed conditions? How can the distributor distribute, except at a profit? Surely the manufacturer himself would not and could not very long do business with a distributor who was distributing at a loss. Is there not after all real equity in the common practice which offers the seller the option of revising his prices or allowing the contract to lapse? We must not forget the feature mentioned before of the manufacturer's providing for his raw material and so on; although I have never been on the manufacturer's side of the fence, but I can imagine the case would be quite similar to that of the distributor, that is to say he buys his materials, relying upon his judgment and his experience of the past, and not mainly upon the footing of the maximum amounts called for by his contracts with the distributor.

Again, suppose all contracts should be strictly enforced as written. Such a plan would necessitate some new conditions in the contract. An important change in this respect would be the insertion of a clause providing for a penalty for delay in executing orders, and a requirement for the filling of specifications in the order in which they were placed. Would the manufacturers cheerfully consent to these additions to the contract? The absence of such requirements has been a source of great loss to the distributors in years past, and I think it would be obviously due the distributors to have this protection, should all contracts be enforced to the letter.

I hope the manufacturers here present will, in the discussion following, present their side of this very important question in the most vigorous way, and that they will be able to give some detailed illustration of the harmful effects of the present practice and of losses which they have sustained thereby. We ought to find out where the bad features are, why they are harmful, and what can be done to eliminate them. I take for granted that the distributors need no urging to take up the cudgels for their side of the story—the loss occasioned by long delayed shipments, the completion of certain duplicate items on later orders, with earlier orders untouched, etc.

#### WHERE MANUFACTURERS FIX RE-SALE PRICES

Another point: There is a class of goods on which the re-sale price is fixed by the manufacturer. It has

frequently happened of late years that prices on such classes of goods have been reduced; that is the re-sale price has been reduced, sometimes by an individual manufacturer and sometimes by all the manufacturers in a certain line. It has frequently happened in such cases, I say, that the manufacturers have refused to rebate to the distributor, covering his stock on hand. I do not like this proposition at all and do not believe it is right. I hope this point will come up in the discussion. I am aware of the old reply: "Why not credit us in case of an advance, if you want us to credit you in case of a decline?" This sounds well but is a misfit. An advance in price makes not a whit of difference as between the manufacturer and the distributor, regarding stock in the latter's hands. The stock was bought and paid for at a price perfectly satisfactory to the manufacturer. It may be true that the jobber will make an extra profit on this stock, but the manufacturer does not thereby lose anything. In the other case, however, the manufacturer says, "The goods you bought to be re-sold at a certain price, which was fixed by me, you must now sell cheaper—at a reduced price also fixed by me, and you will have to pocket this loss yourself." In this case the distributor has no alternative for he can no longer get the old price.

It seems to me to be clear that the man who establishes the price and then reduces it, should stand the loss; and that he does not thereby establish a claim to an additional profit on sales made previous to an advance, through which advance he will profit still more on future sales.

#### AS TO MANUFACTURERS' AGENTS

I should like to say a word, or perhaps ask a question, as to the feeling of the manufacturers regarding the so-called manufacturers' agents or brokers—parties who live in a distributing center, obtain agencies for the sale of the products of a number of standard mills and sell to whomever they can, whether it be merchant or consumer. I am not prepared to enlarge on this point but I should like very much to know whether the mills themselves find this kind of representation to be generally satisfactory; whether it is not an expense without adequate return, and often a harmful complication in the handling of business, through the efforts of agents whose sole interest is in the commission on the sale in hand at the moment.

The object of this short paper is avowedly to start discussion and, of course, you can't begin to discuss until I have finished. Let me, therefore, close by saying that I am a firm believer in the value of contracts. I believe that they should be bona fide, entered into by the parties in the belief and expectation that they will be carried out. I believe in the elimination of the jug-handle kind of contract. It may at times and under certain conditions be profitable to the occasional shrewd buyer, but it is undoubtedly an expensive nuisance to the business community as a whole, and frequently a stumbling block in the way of the legitimate advance and maintenance of prices which are warranted by trade conditions.

#### The Discussion

Following Mr. Sewall's paper the discussion of contract relations was opened by D. A. Merriman, assistant general sales agent American Steel & Wire Company, Chicago. He said it was a mistake for buyers to contract for more material than they could use and a mistake for manufacturers to encourage over-buying. Jobbers sometimes place orders in good faith with two or three mills and if business falls off so that they cannot use the steel only one manufacturer may get specifications.

#### A CONTRACT TIME FOR DELIVERIES

Herbert Field, Congdon & Carpenter Company, Providence, R. I., said that if a contract is made it should be carried out both by the buyer and manufacturer. He did not criticize the clause in contracts that provides that the material purchased shall be



specified for in equal monthly installments and that allows mills to cancel on steel not so specified, but he did object to the fact that while manufacturers tell buyers when they must specify for material there is nothing in the contract as to when the steel is to be delivered. As a result the buyer suffers a loss if he cannot get deliveries when he wants them. Manufacturers should insert in contracts the time of delivery clause so that buyers would know when they are to get their material. Mills should not overload themselves so that they cannot fill orders and he believed a clause specifying time of deliveries would discourage speculative selling by mills.

Col. H. P. Bope, vice-president and general sales manager of the Carnegie Steel Company, defended the mills in regard to the carrying out of contracts. He considered this subject of agreement between buyers and sellers one of the most difficult in the commercial world. England had gone further than any other country in solving the problem, as in that country the terms of a contract are lived up to by buyer and seller. He had seldom seen an iron and steel contract in this country that could be enforced to the letter, with the exception of those involving pig iron. There a contract is a contract and iron bought must be taken by the buyer at the contract price. Colonel Bope declared that conditions in the steel industry in this country are materially different from those in England. Our own industry is notable for the magnitude and rapidity of trade changes, due to the magnitude of the country's area and resources. The Carnegie Steel Company makes more steel than England and Belgium together, and the United States makes more than the rest of the world put together. So when conditions in our industries react, affecting business as a unit, it means a big depression in the steel trade, while special activity puts an enormous strain upon our facilities.

The speaker admitted that his company had at times shown a tendency to oversell. It had been the company's purpose to build up its trade and to be liberal with its customers. He explained how an unprecedented demand for steel causes mills to fall behind on deliveries. But the wide fluctuations in railroad demand are a great factor. So far the railroads had purchased only 46,000 cars this year and it did not look as if they would buy many more,

although they ought to buy 150,000 every year. Next year they may buy 200,000 to 300,000. When railroads start to buy, allied industries must also order steel and the mills are unable to meet the demand. Consumers want their material and want it quick. Then after a while prices sag, buyers do not specify and mills find themselves with quantities of raw material on hand and no orders.

#### MONTHLY ADJUSTMENTS OF PRICES

The most satisfactory form of contract used by the Carnegie Steel Company, to his mind, is the market price contract, in which the effort is made to cover all the points involving buyers' and sellers' interests. He explained that under such long time contracts the prices are fixed for a period of either a month or a quarter and if market prices go up or down before a readjustment neither the buyer nor seller can suffer much. In the case of monthly adjustments, the seller meets the buyer on, say, the 20th of the month, and a price is arranged for the coming month.

Colonel Bope said that buyers in criticising the mills take in consideration only a short given period. If they would take into consideration their treatment by mills in the matter of deliveries over a long period the facts would show that they are generally well treated by the mills. When crowded with orders his own company parceled out material so that no customer was ever forced to shut down his plant because of being unable to secure steel. It is the aim to treat every customer as justly as possible, though no customer seems to understand why his order should not be filled at once, regardless of other orders the mills are striving to complete. If any one is favored it is the buyer, who would have to shut down if he didn't get steel.

James A. Coe, J. A. Coe Company, Newark, N. J., thought that buyers should distribute their orders among several mills, believing that if they did so they would have better chances of delivery during a rush. O. B. Bannister, Muncie, Ind., was in favor of having manufacturers abolish their sales department and allowing jobbers to handle their goods. H. J. Gamble, American Iron & Steel Manufacturing Company, Lebanon, Pa., thought that it would be better for the jobbers if time contract purchases were eliminated.

## Providing a Shop Drinking Water System

Distilled Water, Cooled by Machine-Made Ice, Is Preferred—An Operating Cost of a Dollar a Day per 100 Persons

BY STERLING H. BUNNELL

The provision of palatable drinking water to workmen is one of the necessary expenses in every works. Drinking water service may be classed under the head of welfare work; but it is not one of those branches of welfare work regarding whose necessity there is any question. The provision for drinking water may be of any scope, from the boy with the water pail, to the complete system of piping with simple cooling means for the water supplied to drinking fountains conveniently placed throughout the works.

It is desirable to provide a sufficient number of outlets located wherever a reasonable number of men are at work, and so placed as to require the

least possible loss of time in going to and from the drinking fountains. Aside from the actual time lost in walking from working places to drinking fountain, all errands are sources of delay by giving men an opportunity to meet at common points and stop for conversation, and by breaking the routine in the work, and causing delay in taking up tools or materials again upon the workman's return. A conveniently arranged drinking water supply promotes the comfort of the workmen and therefore tends to increase the speed of work. Secondly, the provision of good water, not too cold, promotes the general health of the operatives and reduces the number of absences from sickness. This indirect

benefit is not merely theoretical but a real source of increased output, for in many cases where drinking water has been installed the improved attendance as shown by time sheets has been marked.

In planning a drinking water system, the first matter to be decided is the quantity of water to be provided for each person. Observation of actual installations shows that this quantity varies from one-half gallon per person in office buildings, to two gallons per person in outdoor work in the summer, and in hot factories such as steel works. These figures are based on the summer consumption; in winter the amount of water required for office employees falls to a fraction of the summer requirements. Employees working near furnaces require a large amount of water the year around.

#### DISTILLED WATER PREFERRED

The quality of the water provided for drinking purposes cannot be too carefully considered. There is much argument among physicians over the advantages of natural water containing mineral substances in solution, as compared with soft or distilled water for drinking purposes. One party argues that a certain amount of mineral salts are necessary for bodily health, while the opposing party claims that the solvent effect of distilled water is extremely beneficial in preventing too great accumulation of lime and other minerals in the human system. Drinking water supplied in factories will never form the entire water supply for any workman, as more hours are spent outside than within the factory walls. It is much easier to provide absolutely pure distilled water by the use of waste heat, such as exhaust steam in evaporators, than to obtain a natural supply entirely free from the possibility of contamination. For factory drinking water systems, therefore, distilled water is generally preferred, and is always safe.

#### DISTRIBUTION

The distribution system provided in a drinking water supply should be carefully planned to supply water to the outlets as cool as possible, as compared with the original temperature at the source. In order to prevent large waste of water by running it at the fountains until the stream becomes cold, the system should be a closed loop with continuous circulation provided for. With a good circulating system cool water is always flowing past each outlet, and reaches the opening of the fountain at the instant the valve is moved to permit the outflow of water, so there is no excuse for running a stream for some time before starting to drink. The work necessary to circulating the water in the pipe system is a source of heat, so that every horse power expended in pumping the circulating water returns 42 B.t.u. per minute to the current of water in the pipe; for this reason the circulating pipe should be of generous size, and as straight and direct as possible, to avoid unnecessary friction. In almost every case, water must be cooled artificially for drinking purposes in the summer months. If the cooling means be placed at the top of a circulating system, gravity may be depended upon to assist the circulation. Since the down-flowing stream of water will be colder than the upward-flowing return water, the cold water in the down line will be denser than the warmer water returning, and the difference in density will keep up the circulation, particularly if the installation is in a building several stories in height. The circulating pipe should of course be carefully covered with good non-condensing material. Under the best conditions a rise of 4 or 5 degrees tempera-

ture may be expected in the return water and this may run two or three times as much if the circulating system extends to great distances in hot rooms. It is wise to provide circulating pipes sufficiently large to make the rate of flow of water through the pipe not over 20 ft. per minute. For the maximum draft, a speed of flow of 100 ft. per minute may be allowed in lines leading to principal outlet points. The circulation system should be made large enough to permit of circulating at least twenty times the average quantity of water required for drinking purposes.

#### ICE MACHINE FOR REFRIGERATION

In providing refrigerating means for cooling the drinking water supply, an ice machine is to be preferred to the use of natural ice, in most cases. If, however, a shop is located in a part of the country where natural ice is convenient and cheap, the ice may be used direct by providing an ice receiving tank, in the bottom of which cooling coils are placed. The drinking water is circulated through the cooling coils as part of the system, and the ice lying upon and melting over the coils provides the necessary cooling means.

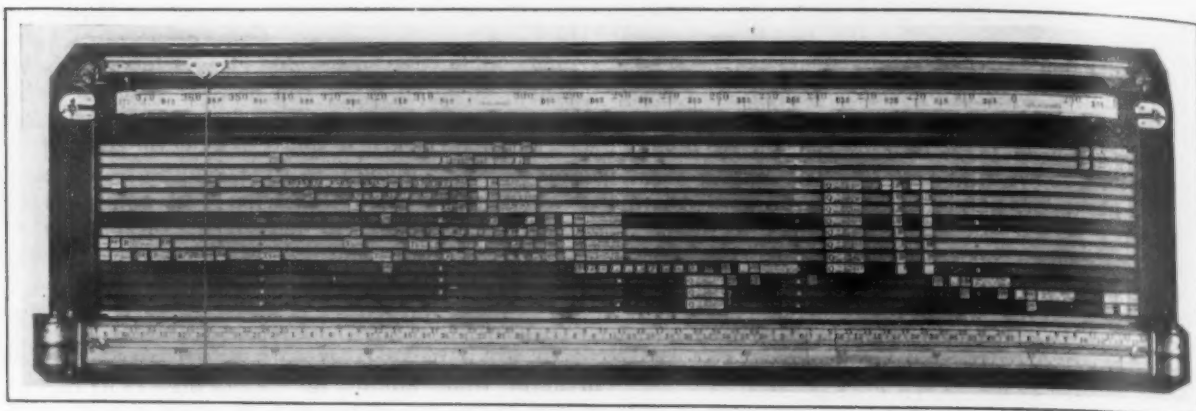
In most factories power is easily obtainable, and labor is to be saved as far as possible, so that the ice machine has very great advantages over the use of direct ice at any cost. If the refrigerating machine can be placed at the top of the building, the difference in weight of the cooled water flowing down, and the warmer water returning, assists the circulation and may even make it unnecessary to provide a circulating pump, as mentioned above. In most cases, however, a circulating pump is necessary to insure a regular flow of water through the pipes. The circulating pump may be a plunger pump, driven by a geared motor, or a centrifugal pump direct-connected to a motor. In either case, the pump should be covered in the same way as the circulating pipe, so as to avoid accumulating frost and snow on the exterior of the pump, and the consequent loss of refrigeration.

The cooling effect of the refrigerating machine may be applied in any of several ways. Brine coils, or direct-expansion coils, may be immersed in an open tank placed at the top of the circulating system, and the water regulated by a float valve in this tank. With this arrangement, the pump may be placed at any convenient point below the tank. Another arrangement possible is to provide a closed water cooler containing direct-expansion or brine-circulating coils, placed in the water circulating system at some point below the open supply tank. With the cooling medium in coils and the drinking water outside, the formation of ice in the drinking water tank does no harm. It is unsafe, however, to attempt to circulate the drinking water through pipes immersed in a brine cooling tank, for any accidental fall in the brine temperature to a point below freezing will necessarily freeze the drinking water coils solid, and may cause them to burst.

Another arrangement is to place the make-up tank on the same level as the refrigerating machine and at the lower part of the circulating system, and to use this make-up tank as a suction tank for the circulating pump. In this case the pump must be controlled by a pressure governor, so as to vary its speed sufficiently to keep up with a rapid draft of water, if the natural speed of the pump is not sufficient to provide for all such emergencies. This arrangement is the only one by which it is possible to put refrigerating machine, water cooling tank, pump and make-up device on the ground floor.

(Continued on page 1443)

Model of the Control Board, So Called, a Mechanical Device Used in the Franklin Automobile Plant for Governing Manufacturing Operations



## Results of Applied Scientific Management\*

What Four Years of the Taylor System  
Have Proved at the Plant of the H.  
H. Franklin Mfg. Company, Syracuse

BY GEORGE DE A. BABCOCK†

A desirable attainment and one which influenced us to direct our attention to the Taylor principle of scientific management was the elimination of the peak load of employment of workmen. The tendency in automobile production has been to follow very closely a schedule established by public sentiment and seasonable demand, with the result that labor to produce was drawn from a normal market and usually about the time that the market had again filled was thrown back on it.

If a community could so select its industries that the average peaks of laborers employed in all of the individual industries gave a uniform

Some causes of peak load in the employment of workmen beside that of management are uncertainty of demand for product, seasonable demand for product, small capital invested in the business, strong competition with small margin of profit, any of which can be materially improved by plans founded upon analytical study and constructive action.

### RESULTS IN BRIEF OF THE FRANKLIN EXPERIENCE

Our experience has been that through applied scientific management efficiencies have been created, sales have been enhanced due to better de-

### The Works Problem

Limited quantities of large costly units are made, the rate of demand for which is affected by the seasons, and the design subject to frequent changes.

Each unit is composed of many assemblies of parts. Parts and assemblies must be frequently tested for strength, noise and perfection of operation.

Preparation for operating on a part consumes a large proportion of time in comparison with that required for operating on the part.

The time for the requisition of the material for the first part which is worked on until the unit into which it goes is completed will extend over a period of from 200 to 240 working days, if cost is maintained within reasonable limits.

### The Plan of Solution

To produce units in the least possible time consistent with the maximum ratio of operation time per lot of parts to the preparation time per lot of parts.

To deliver units to the dealers on a variable schedule as closely approaching the seasonable demand as possible and still maintain a uniform producing burden for the greatest number of employees; also to maintain the lowest possible capital investment at all times.

To maintain a low stock of purchased materials due primarily to variety, value, and influence of public opinion on selection.

To attain the above with a high degree of accuracy and finish at the lowest possible cost.

load of all labor in the community, it would be well worth the time of the civic organizations to try to secure such industries for their community as would tend to level this peak load. Of course, if individual industries could level their particular load this would automatically care for itself; although this can be approached in a very marked way, it cannot be as perfect as in the case where industries have been selected by a community for this particular quality.

\*First installment of a paper, which is to be printed in these columns, substantially in full, presented to the National Metal Trades Association, Worcester, Mass., April 22.

†Production manager, H. H. Franklin Mfg. Company, manufacturer of the Franklin automobile, Syracuse, N. Y.

liveries, and lower price and greater confidence of the purchaser have come about by the uniform standard of the quality of the product. This has been further affected by good service, better temper of the sales organization due to promise of delivery being kept, a better impression among those who have come in contact with our works or with the workmen, through seeing the more orderly condition of our plant, and the better feeling of the workmen themselves as reflected in their expressions.

It is no reflection on a management to secure the advice of specialists in methods of operation. Not a day goes by but representative specialists



### The Old Method

The management ordered quantity, form and date of completion of units.

The management and foremen partially planned:  
Time duration of events.

Fixed tools and machines.

General methods of procedure.

Selection, rate and attendance of workman; quality of work.

The foreman estimated detail date for each event.

Assigned jobs to workmen; supervised and discharged workmen. Ordered repairs to machines and equipment; selected and maintained perishable tools and supplies.

The foremen and workmen determined detail methods to pursue, quantities to start on each event and time to complete work.

Parts for assemblies were equalized by foremen and stock chasers under direction of foremen of assembly floors.

*The prime responsibility rested on the foreman.*

### The New Method

The management plans for and issues all orders in complete detail for:

Quantity, form, exact method, time, date of starting, completion and movement of all operations on units, assemblies, and parts; assignment of jobs to workmen.

Materials for production and supply specified, ordered and supervised in stores and process.

Fixed and perishable tools and machines.

Repairs to machines and equipment.

Inspection of work in process and at completion.

Parts for assemblies equalized by direct orders of management. No stock chasers are employed.

The management and foremen supervise: rate, attendance, and discharge of workmen.

The foreman supervises and assists workmen and management to carry out orders on the floor.

*The prime responsibility rests on the management.*

of machine tool manufacturers advise us that we are in the Dark Ages of shop practice; and this practice perhaps rests upon their product of but a year ago. Structural and tool steel specialists are sure that if we change from their material which we are now using to others of particular chemical analysis our results will be greatly enhanced. We know that it is wise to listen to their advice. The viewpoint is, however, quite different. In the one case we seek for advice that we wish to buy. In the other the specialist has something which he wishes to sell. They are both good and have their place in our industrial development.

The writer was in a responsible position with this company some years before this practical task plan of work was started, and the deductions are from data which was compiled by him over the periods mentioned. I shall not attempt to suggest how others may do, and offer no panacea for poor management. I am trying to relate an experience of the application of a much considered and discussed form of management as translated by one manager for his particular business.

#### FRANKLIN PLANT CONDITIONS IN 1908

The condition of plant at starting is shown by a letter from Carl G. Barth, written May 28, 1908, after a complete inspection of our plant and methods. (Mr. Barth later became a consulting engineer with our company on this subject, and

at the present time is in that capacity.) Mr. Barth wrote:

I wish to attempt to show that you have the possibilities of getting the system installed for less money and in a shorter time than any concern I have so far dealt with—

Your shop is a modern one in every respect and will require a minimum expense in adapting its machinery to the work.

You have most excellent drawings of your product that will require little if any changes to make them in every respect as good as the best I have ever met with—

You have already collected the greater part of the information needed for the routing of this product through your works in accordance with our methods.

You have already a system of inspection of this product, and best of all a special inspection room to which part at least of the product is actually sent. This can be readily lined up with our method of handling the inspection.

You have a good store room for general supplies and methods of keeping track of the same, which can easily be switched over to our way of handling them. However, I anticipate considerable difficulty with all of the finished parts and supplies you have scattered about the factory in various ways; for all such stuff must be absolutely inaccessible to the workmen until finally delivered by the storekeeper for use on definite manufacturing orders or directly for shipment.

You have in Mr. — a man who can readily be released from other work and give his whole attention to learn and work for the system and be its guardian and exponent when fully installed.

In view of the foregoing I believe that the system can be installed in your works in much less time than I suggested in my first letter to you before I visited your plant, say anywhere from 21 months to 2½ years with less of my time of 10 days a month during the latter part of this time. The investment which you will make over this period of course

### The Old Result

The plan of dual responsibility under old methods showed the usual weakness of indecision in emergency, lack of correction for faults due to uncertain responsibility, and doubt and distrust due to lack of knowledge. Opinion was pitted against opinion and a general feeling of indefiniteness permeated the factory atmosphere.

Dates called for by the management were not kept by the foremen, primarily due to the time duration of events being uncertain and irregular.

Material shortages were frequent.

Tools unsuitable and lacking. Machines not suited to the purpose and in poor repair. Tools or machines were not standardized and work could not be rapidly exchanged from one to another.

The change in number of employees was frequent. A large percentage of employees were poorly trained, irregular in attendance, frequently changed.

*The management, foremen and workmen were continuously at odds over results.*

### The New Result

Single responsibility has brought rapid decision.

Faults are few and causes are exactly determined.

Dates planned for are almost exactly met in a large percentage of events. If failure to keep dates is imminent all available help can be concentrated at once on the weakness to make a rapid correction.

Time study has been of great value to ensure dates, even more than it has in application to working costs.

Material shortages are small and infrequent.

Tools and machines in first-class condition and especially selected for the required task.

Employees are much better trained and show less avoidable absence.

Practically no peak load of effort and consequently little change in numbers of employees.

Marked increase in rates of earning.

Marked decrease in cost of product.

*Results accounted for entirely by the management.*

will begin to affect the cost of reductions and make other substantial savings long before the plan is carried out in its completeness.

#### CLASSIFICATION OF STORES

The first application of the work was on our stores requisitioning, purchasing, receiving and issuing. Up to this time we had had a relatively inaccurate annual stores inventory. Although we inspected incoming materials and that very rigorously, the inspection was not performed before their receipt into store. Invoices were passed on receipt; and having no particular pressure on it, inspection consumed a great amount of time and caused delay in moving out of stores. This plan was changed and inspection of raw materials was made before the purchase order was credited with the receipt of the goods. At first this was a difficult task, since the passing of invoices was delayed, but at the present time it demands little of our attention to maintain it permanently in a first-class working form.

Due to the fact that the plan of progress was rather arbitrary and different individuals worked according to their own best translation of what should be done, the burden at times on the inspectors and receiving clerks was tremendous. Express and freight shipments ran high at times and caused a serious amount of overtime work with its incident confusion and inaccuracy. The control plan, which will be described later, has practically eliminated this difficulty, and the flow of materials now in stores is very smooth and uniform.

The receiving clerk had no knowledge of what to expect in any given package but would try to record what he found. The assumption was that he would be more accurate and would not be liable to assume, but this theory has been completely exploded by our more recent experiences. He is now supplied with a copy of the purchase order placed with the vendor and thus knows exactly what to expect from the vendor. When the count is made for the passing of the invoices of small materials, like forgings, castings, etc., that can be bagged, they are counted out not by tens or some even number, but in the size of the outgoing lot. They are then bagged in these lot sizes, wire is wrapped around the bag and through the cloth and a lead freight-car seal locks it. A tag with proper data is attached and the material is sent to the bin location as marked on the stores-receiving clerk's copy of the purchase order. This bin location is carried by the stock tag when closed (and we have a stock bin tag for each lot of material) to the stores balance sheet. When a requisition is written by the balance clerk he adds old location, which is the usual assigned location. This has eliminated much confusion due to moving materials on receipt of new lots to new places in the stock room. The possibility of bagging this material in standard lot sizes is due to the control plan mentioned.

#### WHAT THE PURCHASING DEPARTMENT GAINED

The purchasing department was forever rushing or holding up orders, and of course the parties from whom we purchased had the same experience. In the recent year or so our orders have been placed with such regularity that within a few days that they should receive an order, some of our vendors call and ask if they shall make preparations for an order which is due.

The purchasing department has materially reduced its cost and seems to be exceptionally happy under the new order of things. Perishable goods have been put under a double bin system, and others will be as fast as we can physically arrange

for it. In this double bin system the receipt of material is not confused with outgoing, or on hand. Issues bring the bin stock tag to a flat zero as one-half of the bin is emptied. It allows extraordinary check of materials on hand, and it takes the stock man in as a factor in accurate record.

Rejected materials are handled with dispatch. Surplus has been very materially decreased and the equivalent stores investment reduced. The quick handling of the stock in the room, on account of all lot sizes being maintained standard, and the delivery to the shops and through the shops has furnished a considerable amount of our savings. I quote from a report from the man who was at that time head of the stores department and is now assistant superintendent. The latter appointment was in recognition of his services in assisting us to bring about this result, as one of many.

March 16, 1914.

MR. G. D. BABCOCK,

Production Manager.

After my conversation with you on March 14, I wish to submit the following reports: During the year 1910 we employed 34 men in the Purchased Stores room at an expense of \$381.07 a week. We are now employing 13 men there at a cost of \$183.67 a week, a saving to the company of \$197.40 a week. During the year 1910 we employed in Finished Stores room 10 men at a cost of \$97.96 a week. We are now employing 6 men at a cost of \$78.41 a week, showing a saving to the company of \$19.55 a week. Internal movement of the stock during the year 1912 required 9 men at a cost of \$108.84 a week. We are now employing 4 men at a cost of \$53.01 a week showing a saving of \$55.83 a week. The three departments are now showing an annual saving over 1910, 1911 and 1912, of \$14,184.56 a year.

(Signed) WM. DUNK,  
Chief of Stores.

Much of the saving of the above, as will be shown, has been due to a less complicated product, and this is quite especially true in the purchase stores.

To sum up the stores situation the peak has been practically swept off and the employees feel but a uniform burden of effort. We have practically no experience of the unexpected happening. The same features that affected the stores department marked the experience of the purchasing department.

Coincident with the initial planning for the handling of stores, we began the classification of stores and the reconstruction of the clerical methods of handling the accounts so that they would be of prime use to the works as well as to the accounting department. The accuracy of our stores inventory has increased each year due to this careful work and the particular method employed of checking, until now with a considerably less number of clerks we have a very much greater amount of information. This information is accurate. As evidence of the latter the auditors of our stock company gave us a clearance for the last year of 0.3 per cent. error of stock on hand, and approximately 0.03 per cent. error on the transactions in and out of stores for the year. This clearance was determined by a detailed check of our ledgers and material on hand and of the accounting department records.

(To Be Continued)

The Duluth office of the H. W. Johns-Manville Company has moved to larger quarters at 327 West First street to take care of its increased business. The new office is on the ground floor, with windows for the display of the company's J-M asbestos roofing, pipe coverings, packings, sanitary specialties, auto accessories and other products.

## A 20-IN. DRILLING MACHINE

### A Self-Oiling All Geared Tool for Handling a Wide Range of Work

The Barnes Drill Company, Rockford, Ill., has brought out a self-oiled 20-in. all geared drilling and tapping machine, equipped with back geared feeds and automatic stops. If desired, reversing friction clutch gears and an automatic reverse can be supplied, and the back gears may be omitted. The machine is designed to handle high-speed twist drills from  $\frac{1}{4}$  to  $1\frac{1}{4}$  in. in diameter, at the speeds and feeds which are now considered standard practice. For high-speed drilling on sizes under 1 in., special crown gearing to double the spindle speeds can be furnished.

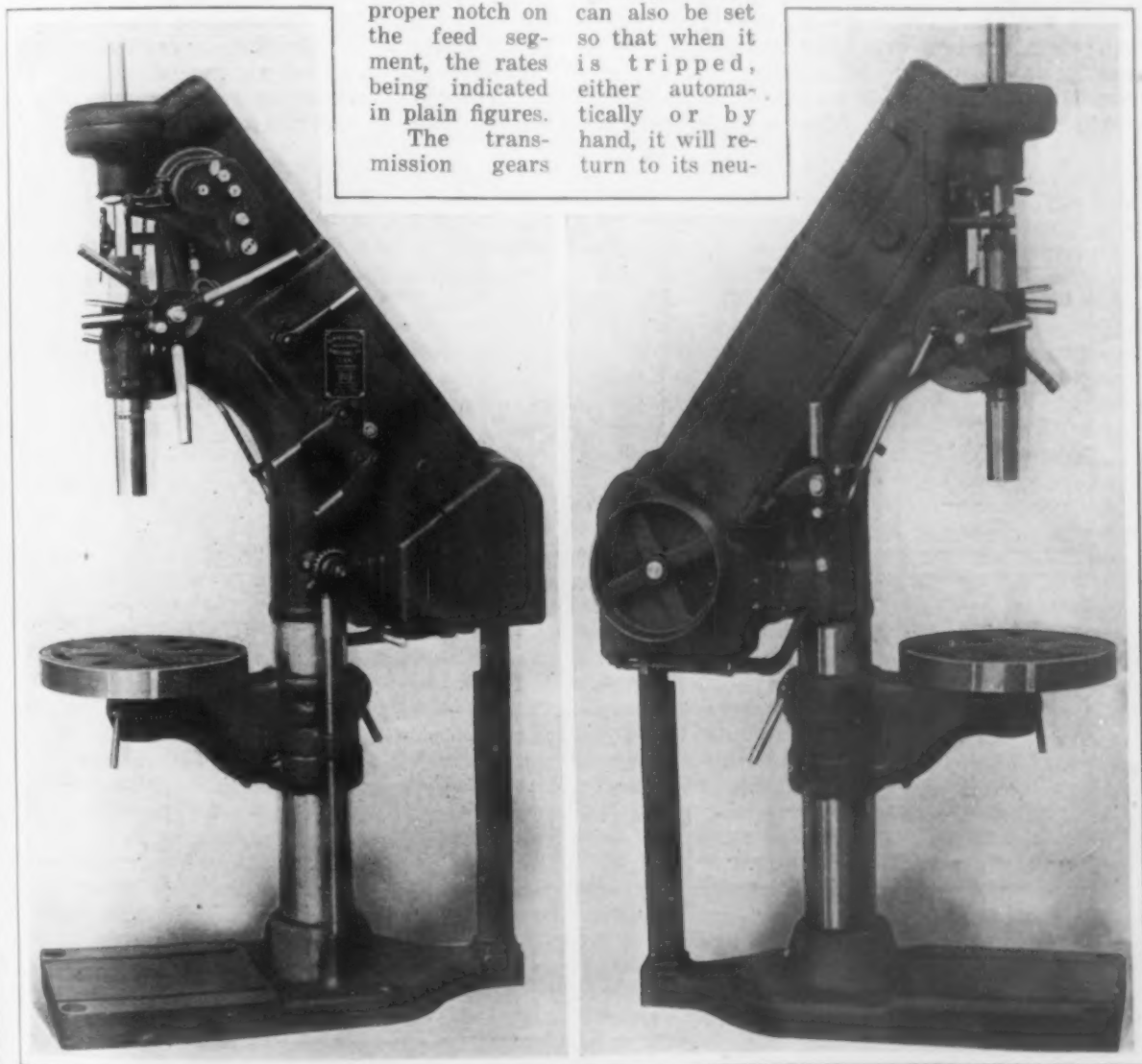
As will be noted from the accompanying engraving the frame of the drill is of a new heavy and strong design, the back brace being relied upon to add to its rigidity. The spindle is double splined and is finished to size by grinding. A special ball thrust bearing is fitted to it and a counterbalance is provided. The nose is extended to bring the drift hole below the sleeve, which is graduated in inches and millimeters. There are eight changes of geared feeds, ranging from 0.004 to 0.049 in. per revolution of the spindle, any one of which can be secured while the spindle is running idly. The shifting of the feed gears is controlled by placing a small index lever, which is located directly in front of the

operator, in the proper notch on the feed segment, the rates being indicated in plain figures. The transmission gears

are located on the diagonal shaft and are cut from chrome nickel steel bar stock. There are four speed changes which are increased to eight by the use of the back gears. Any one of these can be obtained without stopping the drill by operating the shifting lever, which is conveniently located in front of the machine. The back gears are also operated by a small lever accessible from the front of the machine and can be instantly engaged or disengaged while the machine is running.

An automatic stop giving full spindle travel is furnished, and a safety device is relied upon to prevent overloading and reduces the breakage of the twist drills to a minimum. A star wheel is provided to give hand feed for the spindle. This operates through a pinion meshing with an internal gear, having a ratio of 4 to 1 and also serves as a quick return lever, thus eliminating the use of a ball handle for the purpose.

For tapping friction clutch gears, which give a reverse speed of  $1\frac{3}{4}$  to 1, are provided. These are located on the driving end of the machine, which is relied upon to eliminate the wear and tear of clutches placed directly on the spindle, as the machine is geared down to 13 to 1 in front of the clutch gears. An automatic reversing mechanism for use in depth tapping is furnished, if desired. The chuck can be set so that when the tap reaches the desired depth the spindle will automatically reverse and back out at an increased speed. The shifting lever can also be set so that when it is tripped, either automatically or by hand, it will return to its neu-



Two Views of a Self-Oiling 20-In. All Geared Drilling and Tapping Machine



tral position and stop the spindle instantly, instead of reversing it. A small hand trip lever is always ready for instant use, so that the spindle can be reversed or stopped immediately at any point in oper-

ation, thus giving the required depth of hole.

If desired, geared motor drive can be supplied, a 2-hp. unit operating at 1200 r.p.m. being recommended.

## Economical Collar and Washer Production

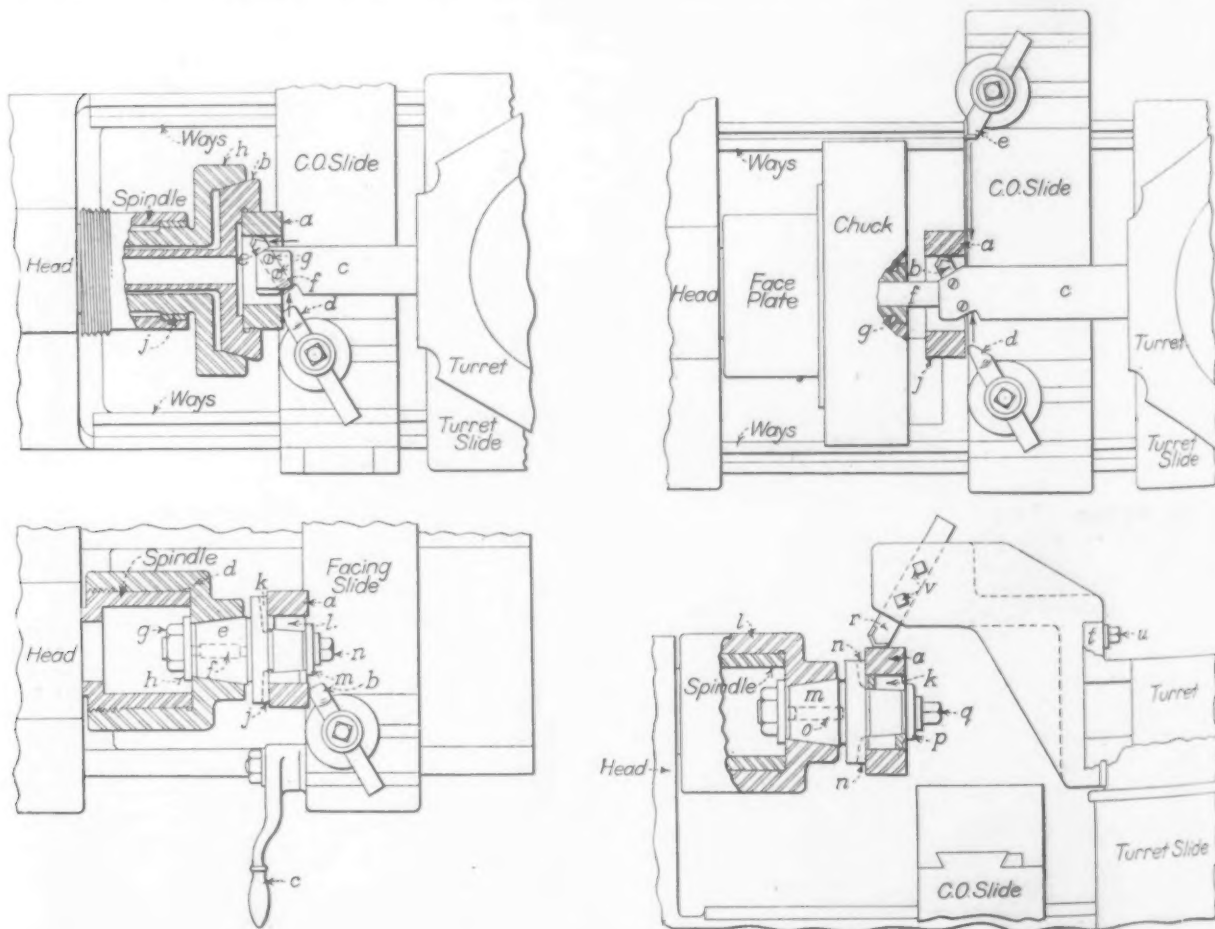
### Suggested Tool Layouts and Machining Methods for Manufacturing from Rolled Bar and Plate Stock Parts Commonly Required

BY ALBERT A. DOWD

The problem of cheaply machining the various sizes of collars and washers commonly used in machine tool construction is one that confronts nearly all manufacturers engaged in this line of work. By a judicious classification of the various sizes, it will be found that two or three methods of handling will suffice for all work of this character, and the tooling may be simplified so that it will cover a considerable range of work. The methods given here are used by a well-known firm of machine tool builders and have proved successful in reducing the cost of production, a saving of 50 per cent. over previous methods having been effected in some cases. The first step in the improved method was the classification of something like 60 blue prints, covering every size and shape of collar used by the company. These were found to run from 1 to  $8\frac{1}{2}$  in. outside diameter and from  $\frac{5}{16}$  to  $1\frac{1}{2}$  in. in thickness. They were grouped ac-

cording to the outside diameter, the maximum dimensions of each of the three classes being  $2\frac{1}{2}$ , 4 and  $8\frac{1}{2}$  in., respectively. It was then decided to make the first group from cold-rolled steel, the second from black bar stock which had been cut off at very nearly the proper thickness and the third from steel plate ring forgings or castings.

In machining the first group the stock was cut off in lengths of from 36 to 48 in., depending upon the thickness of the washer and the number required for a single lot, after which the entire length was drilled with a hole  $\frac{1}{32}$  in. under the finished dimension on a gun barrel drilling machine. They were then cut into pieces which were  $\frac{1}{32}$  in. wider than the finished dimension on a power machine. These three operations were inexpensive and required no special tooling. The next operation was boring, reaming and facing on a turret lathe of standard make, and a part of the



Finishing Collars Made from Cold-Rolled Stock

The Final Operations on Washers Manufactured from Bar Stock

Fig. 1—Tool Setups for Machining Washers

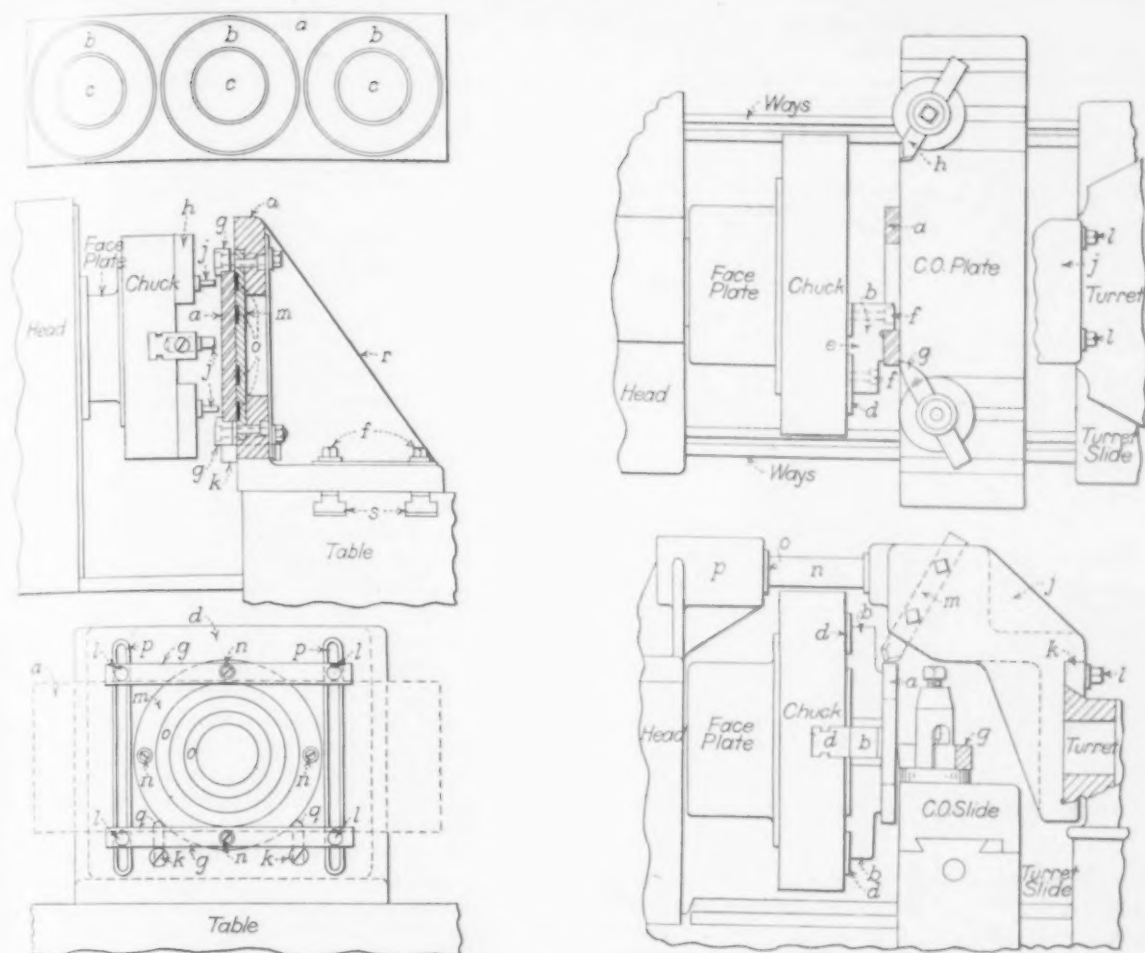


Fig. 2—Cutting the Blanks for Washers Made from Steel Plate and the Turning and Facing Operation

tooling and the method of holding the work is shown in the upper left portion of Fig. 1. The collar *a* is held in the jaws *b* of a step chuck. These jaws are bored to the size of the outside diameter of the work and are drawn back into the body of the chuck *h* by the action of the collet closing mechanism at the rear of the spindle, a slight groove being made in the jaws, so that the burr remaining after the cutting-off operation will not cause trouble. The hardened steel ring *j* on the end of the spindle is ground in position to give a high degree of accuracy. Three different sizes of boring bar, one of which is shown at *c*, were found necessary to cover the range of work in this group. The tool *e* has a backing up screw at *f*, so that accurate settings may be made with very little trouble by slightly relieving the pressure of the binding screws *g*. Several tools of varying lengths were found desirable for these bars, and a single boring bar followed by a floating reamer was found to give sufficiently accurate results. Facing was accomplished by the tool *d* in the cut-off slide. In one or two instances a finishing tool was mounted at the rear of the slide, so that a close degree of accuracy was secured, but in nearly all cases a single cut was sufficient. Corner burrs were removed with a file by hand, while the boring and turning were being accomplished.

The method used for the final operation of facing up the other side of the collar *a* is shown in the lower left portion of Fig. 1. The machine used for this work was a screw shaving machine having an adjustable facing slide operated by the lever *c* through a rack and pinion. The facing tool *b* was ground so that it had considerable drag, and a good finish was secured. The steel nose piece *d* was screwed to the spindle and was tapered to receive

the end of the arbor *e*. Two arbors were found sufficient to handle the range of work in the first group. These were of tool steel, hardened and ground to a taper at each end. A Woodruff key is used at *f*, and the arbor is drawn back into the taper by the nut and washer *g* and *h*. The bushings *l* are of various sizes to suit the work and are split in six places, three cuts being taken from each end to secure even expansion. The bushings are forced back on the taper by the collar *m* and the screw *n*. The slots at *j* and *k* are to assist in ready removal of the work.

In machining the washers of the second group a hole is drilled in the stock, leaving 1/32 in. for finishing, and the stock is cut off in a large screw machine having collet mechanism. The next operation is boring, reaming and facing on a turret lathe, and the upper right corner of Fig. 1 shows the setup for this operation. The work *a* is held by the outside in a set of special jaws, which are slightly grooved at *j*. The depth of the shoulder of the jaws is slightly less than the thinnest one of the collars, so that the same set of jaws can be used for all the pieces. The chuck is of three-jaw geared scroll variety and is supplied with a hardened and ground steel bushing, *g*, which acts as a guide for the piloted end of the boring bar *f*. These bars *c* are of 0.040 per cent. carbon steel and are carbonized, hardened and ground on the piloted end to a running fit in the chuck bushing. The tools *b* are set in the bar at an angle similar to that used in machining the first group and have screws to enable fine adjustments to be made easily. A floating reamer follows the boring bar and brings the hole up to size. The front of the cut-off slide carries a rough facing tool, *d*, and the rear of the slide is furnished with the finishing tool *e*.

The lower right corner shows the arrangement of the third and final operation on the group of collars, which is the turning of the outside diameter and the facing of the other side. Both of these operations are performed in a turret lathe, and in this instance the work *a* is held on an expanding arbor similar to that used for facing the other group of washers in the screw shaving ma-

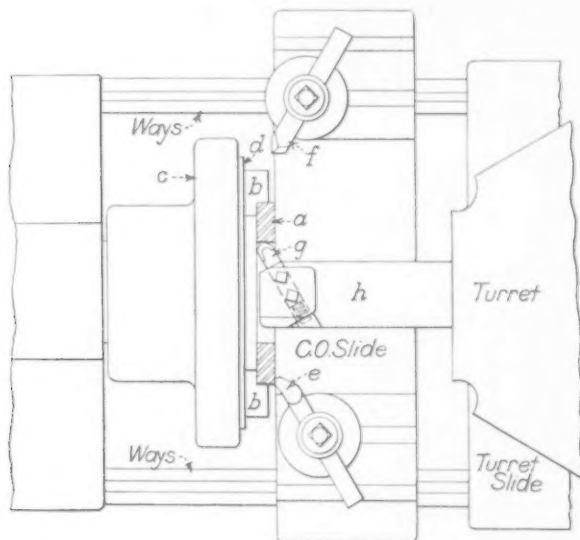


Fig. 3—The Tool Layout for Boring, Reaming and Facing Plate Washers

chine. The steel nose piece *l* is screwed on the spindle end. It is tapered to receive the end of the arbor *m* and is keyed at *o*. Two arbors are sufficient to accommodate all the pieces in this group, but a number of bushings *k* are provided to fit the various holes. These were split and were forced back on the tapered end of the arbor by the action of the screw and washer *q* and *p*. The slots *n* provided a means for quick removal. The outside turning was accomplished by two special overhead turning tools, one of which is shown at *f*. These tool bodies are made of cast iron and are dovetailed to fit the turret face on which they are secured by the gibs *t* and the screws *u*. A rectangular slot in the tool body receives the tool *r*, which is secured in place by the two screws *v*. Greater accuracy is secured by mounting the tools in a vertical plane, because the errors of the turret indexing are minimized and more room for the cross slide tools is also secured. Cross slide tools of a similar nature to those used in the previous operation are used for the facing, but are not shown to avoid complicating the drawing. In all the tooling for the second group it will be noticed that simplicity and adaptability have been studied so that the entire group can be machined with a minimum number of tools. Little time is lost, as the cutting action is almost entirely continuous. Another advantage is that as the tooling is alike in all instances the operator becomes thoroughly familiar with the various tools so that he can handle them to the best advantage, and productive efficiency is therefore very high.

The larger sizes of collars and washers, which vary in thickness from  $5/16$  to  $1\frac{1}{2}$  in., were formerly made from machine steel ring forgings. It was decided to reduce the expense of this class of work by making the collars that were not over  $3/4$  in. thick from black machine steel plate and that the heavier and thicker collar should be made of cast steel whenever possible. In the upper left corner of Fig. 2 is shown a portion of one of the plates from which the washers were cut, *a* being

the plate itself, *b* the cut-out washer and *c* the circular remainder blank. These remainder blanks were used for some of the smaller washers in a great many cases, so that there was very little waste stock.

A horizontal boring mill was selected for drilling this work, and as it was of a belt feed type and the feeds were too coarse for work of this character, a large wooden pulley was made by the pattern maker. It was made so that it could be fastened to one of the feed pulleys and was proportioned so that it would give a longitudinal carriage feed of 0.0035 in. A cast-iron angular fixture, *d*, was fastened to the carriage of the machine by the screws *f* which enter the shoes *s* in the T-slots of the table. This fixture had two stiffening ribs *r* to insure rigidity. Two vertical slots *p* are cut in the face of the knee and serve as a guide in which the bolts *l* travel. Two clamping bars *g* at the top and bottom were used to hold the plate *a* in any desired position, and the two screws *k* simply acted as a support for the lower clamping bar when it was not in use, thus preventing the lower bar from dropping down and causing trouble when the plate had to be reset for another cut. Vertical adjustment of these two screws was permitted by the slots *q*. The face of the knee is recessed to permit the disk *m* to be held in position by the screws *n*, so that its face lies flush with that of the knee. Two narrow annular grooves *o* were made in the face of this disk, and were filled with babbitt and faced up flush, a number of these disks being made with different spacings to take care of the various sizes of collars. If the grooving tools should cut into the babbitt filling it can be readily replaced. A four-jaw independent chuck is mounted on a face plate which is screwed to the spindle as shown. The four jaws *h* are drilled to receive the cutters *j*, which are of high-speed steel and are held in place by screws. A bushing is placed in the center hole of the chuck and a plug inserted in it when setting the cutters for the various diameters. It will be seen that measurements can be made from this plug to the various cutters without difficulty so that accurate settings could be made readily. As will be noticed from the upper right portion of the illustration, clamps grip the upper and lower edges of the plate but little, so that cutting can be accomplished with but very little waste. A complete washer  $8\frac{1}{2}$  in. in diameter and  $5/8$  in. thick could be cut out in this way in about 5 min.

The right half of Fig. 2 shows a plan view at the top and a front view at the bottom of the tool layout for turning the outside diameter and facing the cut-out blank, it being noticed that in the upper view the turning tool *j* is broken away so that the chucking will be more readily apparent. The work *a* is held by the inside in this instance in a set of special jaws *b*, which are removable and are tongued at *e* to fit a sub-jaw, *d*, in the chuck, two screws *f* being used to hold the jaw in place. A construction of this kind makes possible the application of a number of different styles of jaws to the sub-jaws of the chuck, a simple drill jig being required to register the screw holes correctly. The roughing and finishing facing tools *g* and *h* are mounted on the front and rear of the cross slide. The turning tool *j* which is of cast iron is dovetailed to fit the turret face and is secured to it by the gib *k* and the screws *l*.

The pilot *n* is mounted at the forward end of the tool and enters the bushing *o* in the spindle cap bracket *p*, thus insuring a very rigid construction. A rectangular slot in the body admits



the tool *m*, which turns the outside diameter of the blank, it being possible to handle a considerable range of work with this type of tool. As the tool is in a vertical plane it is possible to maintain accuracy and to use cross slide tools in connection with the turning tool. Two tools of this kind were made, one for roughing and one for finishing, and they were found convenient for other work than that for which they were designed.

Fig. 3 shows the tool layout for the final operation on the blank *a* which is that of boring, reaming and facing. Another type of step chuck, having adjustable jaws *b* which are dovetailed to fit four radial slots in the face of the tapered chuck blank *d*, is used for this work. The jaws are held securely in any position by countersunk screws, and the chuck blank is split in four places to permit expansion and contraction, and fits the tapered portion of the closer *c*, which is mounted on the spindle. The tools *e* and *f* at the front and rear of the cross slide respectively are used for the rough and finished facing, while the boring bar *h* is truing up the hole with the tool *g*. In the larger sizes of collars no reamer was used, the holes being finished to size by the action of two boring bars. In case of ring forged or cast washers the method of handling was the same. This method of manufacture for large size collars and washers effected a saving over former methods of manufacture of from 50 to 100 per cent. in a number of cases.

#### Standard Welding Company's Success

The Standard Welding Company, manufacturer of seamless steel tubes, rims and rings, Cleveland, Ohio, has enjoyed a remarkable run of business during the last few months, and, in fact, the entire period when business was supposed to be at low ebb. The month of March, 1914, was the biggest in every way that the company ever experienced, totaling 25 per cent. more than March, 1913, and 5 per cent. more than any previous month in the history of the organization, while April orders ran still heavier. On the New York Central system, the Standard Welding Company has risen within a few years from the bottom of the list to the third largest shipper of merchandise in any line. The railroad sidings built only a few years ago, to accommodate enough empties to take care of a week's shipments, are to-day barely sufficient to care for a single day's output. With nearly every department in the plant operating 24 hours a day, the shipments, figured on a basis of 25 days per month, total, within a few hundred pounds, 100 tons per day. In the steel tubing department, which supplies a large part of the bicycle, motorcycle, automobile, and kindred industries, the present output is over 2,000,000 ft. per month, with added facilities rapidly surpassing each preceding month's total.

About a year ago the Standard Welding Company changed completely its merchandising policy. Previous to that time it sold practically to manufacturers only. Now it sells to the jobbing and retail trade. It has perfected arrangements with more than 30 of the largest jobbers on the continent, whereby its rim product is now carried in all the large centers for distribution to dealers and car-owners in those respective territories.

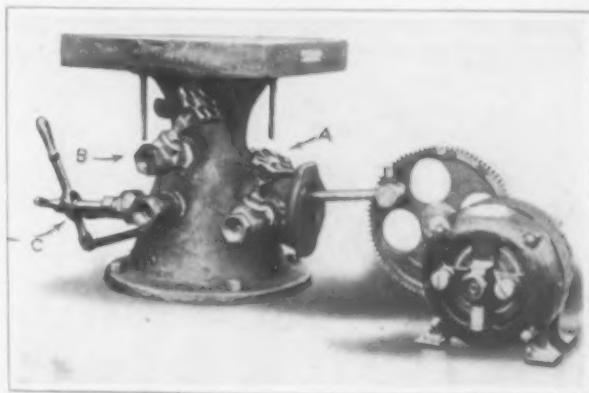
Articles attacked by rust are said to be conveniently cleaned by dipping them in a well-saturated solution of stannic chloride, 12 to 24 hours sufficing according to the thickness of the rust. An excess of acid in the solution must be avoided. After the objects have been removed from the bath they must be rinsed with water, then with ammonia, and quickly dried. They are then said to resemble dead silver.

The first cargo of ore for the 1914 season was received at South Works, Illinois Steel Company, on May 8, in the steamer William B. Dickson.

#### A Motor-Driven Jolt Ramming Machine

William P. Krause, 3623 North Ashland avenue, Chicago, Ill., has built a new type of jolt ramming machine. With this machine it is not necessary to have compressed air in the foundry to operate the jolt ramming machine as the machine itself compresses the air required for its operation.

Air at atmospheric pressure is taken into the horizontal cylinder through the intake valve *A* and compressed until the pressure is sufficient to raise the plunger and table in the vertical cylinder to a point where the plunger uncovers the exhaust port



An Interesting Electric Jolt Ramming Machine in Which the Driving Motor Is Geared to the Piston Supplying the Air Required

*B*. When this occurs the compressed air, of course, exhausts and drops the table and the plunger, the horizontal and vertical cylinders being connected by a small air port. The motor runs constantly, and the operation of the machine can be controlled by opening and closing the gate valve *C*, which, in the illustration, is shown open. This method of operation, it is pointed out, eliminates the use of a clutch. By substituting a three-way valve for the one shown, it is planned to compress enough air while the machine is not jolting patterns to run the vibrator and the blow gun and also store enough air in the tank to raise the plunger and table for drawing the pattern.

The machine is shown in the illustration with the gear case removed and without the piping. It is planned to connect the exhaust to the gear case, so that the exhaust air, which contains a certain amount of oil, can be used to lubricate the moving parts and create at the same time low air pressure in the gear case which will leak out through the joints and blow away any sand that may tend to work its way into it.

#### First Exhibit Installed in Machinery Hall, San Francisco

The first exhibit of the Panama-Pacific International Exposition, a 500-hp. Diesel engine manufactured by the Busch-Sulzer Bros.-Diesel Engine Company, St. Louis, was installed in the Palace of Machinery, San Francisco, May 27, with ceremonies in which State and city officials and executives of the exposition participated. The daughter of W. S. Heger, Pacific coast manager of the Busch-Sulzer Bros. Company, pulled the lever which set the machinery in motion. Capt. Asher Carter Baker, U.S.N. (retired), director of the division of exhibits, presented a deed granting the company the right to the central space in the palace. Nine of the principal exhibit palaces have been accepted from the contractors by the division of works.

The Hjorth Lathe & Tool Company, maker of the Hjorth two-part screw cutting die, has taken up new quarters at 101 Tremont street, Boston.

# New Electrical Manufacturing Plant

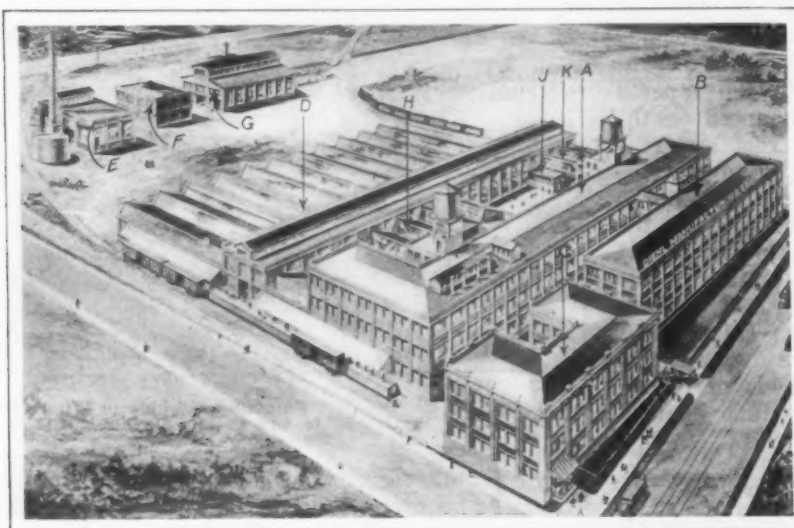
The First Unit of an Ultimately Large  
Establishment—Provision for Future  
Expansion—Rapidity in Construction

The Diehl Mfg. Company, Elizabeth, N. J., has recently built the first unit of its No. 2 plant, which will eventually be a complete establishment for the manufacture of electric motors and generators and

new one was decided upon, to be built in units as the growth of the business demanded.

Before the detailed plans were prepared, a careful study of the present manufacturing methods was made to determine accurately the floor areas required in the new plant and the correct interrelation of the various departments. Provision had to be made for future growth in all of these, and, as the plant was to be built in units, the several departments had to be arranged so that manufacturing could be carried on economically at all times up to the completion of the finished plant.

The various departments provided for in the ultimate layout include the light motor shop A, heavy motor shop D, punch shop H, pattern storage building F, foundry G, finished stockroom K, service building J, and an administration building C. The future light motor shop B, with a garage in one end for motor trucks, and a power plant building, E, are also shown in the



View of the Plant of the Diehl Mfg. Company Showing the Ultimate Layout of the Buildings

electrical starting devices for automobiles. Largely increased facilities were rendered necessary by the expansion of the company's business, and as the old plant did not lend itself to expansion, an entirely

perspective view of the ultimate layout which is reproduced herewith. The main line of the Pennsylvania Railroad bounds one side of the property and two sidings are brought into the



The Interior of the Light Motor Shop Showing the Construction and the Arrangement of the Automatic Sprinklers, Shafting, Etc.

property, the one at the north, or left, being for receiving freight, and the one at the right for shipping, a spur from the shipping siding providing a receiving track for the foundry and power plant. With a view to facilitating trucking, these sidings are depressed to the floor level of the buildings. The several buildings are arranged around a central yard, access to which is by a driveway between the light and heavy finished stockrooms. The rough stores and stockroom departments are all arranged along the north side of the buildings so that the freight cars can be unloaded directly into the stockrooms. The separation of the receiving and shipping tracks causes the material to move across the buildings, the various operations being performed on the way, and as the finished stores departments are along the south side of the buildings, the product is collected and stored adjacent to the shipping platforms. This arrangement avoids all unnecessary trucking of parts and finished machines through the several shops.

The manufacture of the light and heavy motors is in general kept entirely separate, the punch shop and the testing department being the only places where the parts are together. This feature is essential, as light motors are all below 1 hp., a large proportion being used on fans and sewing machines. The parts of these motors are much more fragile than those of the heavier ones, and the manufacturing operations are radically different.

It was decided to erect as the first unit 300 ft. of the light motor shop, which will ultimately be 390 ft. long. This provided the additional space immediately required by the light motor and automobile starter departments, as well as relieving the congestion at the company's No. 1 plant. The type of construction used for this building was reinforced concrete of the flat slab type with brick curtain walls and steel ventilating sash. With the exception of the japanning room, maple flooring is used throughout. On account of the heavy trucking between the dipping tubs and the drying ovens in this portion of the plant, wood block laid on sand is used. The building is equipped with automatic sprinklers and two outside fire escapes are provided. A 30,000-gal. water tank is located on the roof, which is of slag laid on concrete, and eventually there will be a 100,000-gal. tank and a fire pump to afford adequate protection to the entire plant.

The arrangement of the heavy machine shop with a monitor bay, which is served by a 15-ton crane and a machine shop with a sawtooth roof alongside, makes a very desirable layout, as the parts are machined in the sawtooth section under the most desirable conditions of grouping of classes of tools and are assembled in the monitor bay, where there is no interference with the machine work and ample room and crane service are available. The space available under the trusses in the monitor portion is 30 ft., while there is a clear height of 14 ft. under the trusses in the sawtooth machine shop. The punch shop is an extension of the heavy machine shop housed under a sawtooth roof. The heavy motor finished stockroom is an extension of the monitor bay of the same shop and also has a sawtooth roof. The foundry is of the customary monitor type, while the pattern storage building is a fireproof two-story building.

A temporary power plant of corrugated iron construction is situated at one end of the light motor shop and supplies electric light and power as well as steam for process work. The machines in this power plant are of such size that when the additional units of the plant are built they will fit into the permanent equipment of the ultimate power

plant in the building that is to be erected. In the ultimate power plant the boiler and engine rooms are under one roof and an elevated siding is brought alongside of the boiler room to secure a gravity discharge of coal to the level of the firing floor.

The preliminary work on the layout was done by Day & Zimmermann, Philadelphia, Pa., who also drew the plans and specifications for the work. The Turner Construction Company, New York City, was the contractor for the concrete work. The building was ready for occupancy four months after the contracts were let.

### Buffalo Furnaces Refused Lower Coke Rate

WASHINGTON, D. C., June 3, 1914.—The Interstate Commerce Commission has handed down an opinion in sustaining the rate of \$1.85 per ton for the transportation of coke from the Connellsville region to Buffalo, N. Y. The complainants in the case are the Wickwire Steel Company, Buffalo Union Furnace Company, Tonawanda Iron & Steel Company, New York State Steel Company and Lackawanna Steel Company. The rate attacked represents an increase of 20c. per ton and had been previously sustained by the commission in a group of cases involving rates from the Connellsville district to numerous points, including Youngstown, Canton, Cleveland, and Toledo, Ohio, as well as to points in Pennsylvania, Maryland, and New Jersey.

The complainants in this case undertook to submit evidence as to the effect of the increased rate upon the pig-iron industry of Buffalo, as to the cost of manufacture as compared with their competitors, and as to the opportunity of remaining in markets which they had hitherto been able to reach in competition with other pig-iron producers; also they sought to rebut the commission's conclusion that the rate of \$1.85 was a proper one in relation to the other rates from the Connellsville region.

In dismissing the complaint the commission makes a significant statement which is taken by certain observers here to foreshadow readjustments of rates in Eastern classification territory as a result of the proceedings in the now pending rate advance case. In this connection the commission says:

The proposition to which counsel's argument tends, that no comparison of rates is ever justified except upon the actual submission of evidence of similarity of the various circumstances and conditions of transportation, would seem to be a somewhat extreme one. It is well known that rates have been frequently justified or condemned by this commission upon records containing little else than mere rate and distance comparisons; under the condition, however, of a known general similarity of conditions, as for example where the movements compared are of the same commodity in the same territory. Granting, however, that there is some dissimilarity of conditions in the various movements involved in this and in other related coke cases and that the differences now remarked by counsel are of a kind to influence the amount of the rates in question, we may say that, without attempting to assign the precise weight which should be given to these differences, we feel confident that they do not sustain a valid criticism of the Buffalo rate, which we have approved. The rate of \$1.85 to Buffalo is not only not unreasonably high, but on the contrary is low when compared with the present rates to eastern Pennsylvania furnaces. It is also low as compared with the other rates determined to be reasonable by this commission in the related coke-rate cases. A recent examination of the comparison has served only to strengthen this conclusion. Measurement of these rates by an arbitrary measuring rate computed from the rates themselves shows that the Buffalo rate, even using the distance of 314 miles urged by complainants, is still somewhat out of line with the other rates and might if established solely upon the distance basis, which we do not suggest, be put as high as \$1.94 rather than \$1.85.

In conclusion, the commission denies it has gone outside of the record in this case to support its conclusions and contends that at any time it might apply to a current case a rate found to be reasonable after investigation in connection with another case involving similar conditions.

W. L. C.



ESTABLISHED 1855

# THE IRON AGE

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## Shall Unions Have Special Privileges?

A serious situation confronts manufacturers and other large employers. Organized labor has driven a far harder bargain with the leaders of the House of Representatives concerning the exemption of labor organizations from the operation of the anti-trust laws, as provided by the Clayton omnibus bill, than would appear from any of the published statements which have emanated from the members of the House Judiciary Committee. We are advised that these leaders have been driven into a most humiliating position by their anxiety to avoid a clash with Mr. Gompers and his associates. Conscious of the influence of the organized labor vote upon the minds of politicians who must appeal to their constituencies for reelection next November, these representatives of trade unions have pushed their advantage to the utmost and have secured additional concessions since the Clayton bill was reported that, by comparison, render the original pro-labor provisions of the measure, surprising as they were, comparatively unimportant. Employers in every branch of industry will read with interest and astonishment the exact terms of the bargain by which the House leaders have saved themselves from the organized onslaught of the American Federation of Labor and its allied forces and they should lose no time in appealing to the Senate to prevent the consummation of this extraordinary deal.

The details of the labor exemptions as provided by the Clayton bill when reported to the House were recently described in our Washington correspondence. The so-called "concessions" covered two phases of the subject; first, a provision incorporated in the bill as section 7 to the effect that "nothing contained in the anti-trust laws shall be construed to forbid the existence and operation of" labor organizations, etc., "or to forbid or restrain individual members of such organizations, orders or associations from carrying out the legitimate objects thereof," and second, a comprehensive series of eight sections practically forbidding the courts to grant injunctions or temporary restraining orders in labor disputes, and requiring elaborate jury trials for persons charged with contempt of court in connection with labor troubles. Many of the best lawyers in the House of Representatives were strongly opposed to these provisions as being discriminatory and possibly unconstitutional, but although Chairman Clayton and his immediate associates in the Judiciary Committee had framed these provisions in consultation

with the labor leaders, who apparently acquiesced in them, they appear not to have been sufficiently radical to meet the views of Mr. Gompers and his associates, who have demanded and secured additional concessions which render the Clayton bill little better than a farce.

As described by the leaders of the Judiciary Committee, the final "compromise" reached with the officers of the American Federation of Labor consists in the adding to section 7 of the words "nor shall such organizations, orders, or associations, or the members thereof be held or construed to be illegal combinations in restraint of trade under the anti-trust laws." This addition, it was stated by members of the committee, amounted to little more than a repetition of the phraseology already employed in the section. As a matter of fact, the new language so broadens the scope of section 7 that if the Clayton bill is not declared unconstitutional the United States Supreme Court will be estopped from taking any such action as it took in the now celebrated Loewe hatters' case, when it declared the hatters' union a combination in restraint of trade and liable in heavy damages under the Sherman law for a nation-wide boycott of Loewe's goods.

It now appears, however, that the addition made to section 7 is but half the story of the bargain driven by the labor leaders. Not content with an exemption from prosecution under the Sherman law, they have forced the House leaders to so amend section 18 as specifically to legalize practically every device commonly used by organized labor in carrying on a strike. The section referred to as originally reported to the House forbade the issue of restraining orders or injunctions to prohibit any person or persons

from terminating any relation of employment, or from ceasing to perform any work or labor, or from recommending, advising, or persuading others by peaceful means so to do; or from attending at or near a house or place where any person resides or works, or carries on business or happens to be for the purpose of peacefully obtaining or communicating information, or of peacefully persuading any person to work or to abstain from working; or from ceasing to patronize or to employ any party to such dispute; or from recommending, advising, or persuading others by peaceful means so to do; or from paying or giving to, or withholding from, any person engaged in such dispute, any strike benefits or other moneys or things of value; or from peaceably assembling at any place in a lawful manner, and for lawful purposes; or from doing any act or thing which might lawfully be done in the absence of such dispute by any party thereto.

During the many years that the labor leaders have been before Congress demanding such an anti-

injunction law as is provided by this section, the demand has been excused and explained on the ground that it was neither proper nor necessary that such acts as those described should be proceeded against by injunction, for the reason that the injured party had his remedy at law. In securing the final compromise with the House leaders, however, organized labor has thrown off the mask and has forced the Judiciary Committee to consent to the addition to section 18 of the words "nor shall any of the acts specified in this paragraph be construed or held to be unlawful." At one stroke, therefore, the employer loses his right to enjoin the leaders of a mob who are picketing his factory or carrying on an active boycott in front of his store and also the right to secure redress either under the Sherman act or at common law for any injury he may thus sustain. The "concession" so weakly yielded by the House leaders specifically legalizes almost every outrage commonly perpetrated in furtherance of strikes short of murderous assault and arson and renders it impossible to prevent either of these greater crimes by ordinary legal methods.

There is good authority for the statement that many members of the House have brought themselves to acquiesce in these concessions in the expectation that the Senate will give the public a better exhibition of backbone, but even this moderate expectation may not be realized if the employers are not heard from by the upper house. Every effort is now being made to hasten consideration of the anti-trust bills, which alone block the way to an early adjournment, and it will require sharp and vigorous work on the part of those interested to prevent the consummation of this disgraceful bargain.

### To Increase "Independent" Steel Exports

The National Foreign Trade Convention at Washington last week took action which promises something definite in enlarging our outer trade. There was cordial and yet qualified indorsement by the President and members of his Cabinet, who it is to be hoped may yet find that "dollar diplomacy" has virtues not heretofore dreamed of in their philosophy.

One of the seven declarations in the convention's platform is of special interest to the steel industry. It is that which calls for legislation permitting combinations by manufacturers for the carrying on of export trade. Such co-operative effort is plainly in furtherance and not in restraint of trade and it is hard to see how it could be held to violate in any way the spirit of the Sherman law. Yet it was fear of such an interpretation that led to the abandonment of the proposal made two years ago for the co-operation of the leading independent steel companies in a plan for extending their foreign trade. The formation of an export company in which all should have stock was held in some quarters to be inadvisable because likely to provoke Government activity. It is clear that if the independent steel companies of the country are to follow the Steel Corporation in the policy of regularly placing a certain percentage of their output in foreign markets, they must have a foreign selling organization which no one of them could maintain singly. As was pointed

out in the addresses at Washington last week, particularly that of President Farrell, Germany's success in building up her exports has been due in large part to splendid organization work.

If the proposed Federal Trade Commission is really to further and not hamper business, here is work ready to its hand—to show American manufacturers how they can combine their forces without fear of Government hectoring, to make their way into the foreign trade and to do an every-day business in the markets of the world.

### Labor Questions and Publicity

In an address before the National Metal Trades Association at the recent Worcester convention, B. B. Tuttle, of Cincinnati, who as a lawyer has had much to do with labor legislation and the operation of laws governing the relations of employer and employee, laid strong emphasis on the need of wide publicity for legislative proposals which would affect industry adversely and unfairly. He cited the case of the Ohio constitutional amendment adopted by a referendum vote of the people, when the "yes" vote represented practically the entire strength of organized labor, and the opposition vote only a comparatively small part of those people whose judgment would naturally be in opposition. As a consequence laws of the most radical kind have been enacted—laws which, previous to the change in the constitution, had been declared a violation of principles still embodied in the constitutions of most of the States of the Union. Mr. Tuttle put the blame for the result of the referendum on the failure of Ohio employers to bring the proposition sharply before the people in its true light. The outcome is a condition opposed to the common good and even against the interests of many of the workmen who were presumed by their leaders to be the beneficiaries.

That public sentiment is a great power in times of labor disputes is not recognized by many owners of industrial works. They fail to take the people of the community into their confidence. The workmen, threatening a strike or actually on strike, spread broadcast their side of the controversy. The employer often takes a position of reserve. He dislikes to rush into print, and repels the offers of the daily press and other mediums which would set forth his case so that the public might judge for itself. Sometimes he issues a curt statement which gives no idea of the conditions which compel him to refuse the demands which are at issue. Many people who naturally would give him their moral support, if his cause is a just one, fail to do so because they have heard only one side.

Granting that public sentiment is too ready to think that an employer's resources are equal to any demands upon them, with little thought of the competitive conditions in his industry, it is still to be said that free public discussion can injure no cause based upon justice and business ethics. This has been demonstrated time after time in Canada, where no strike or lockout can go into effect until after a commission has made a public investigation and published its findings broadcast in the newspapers. The public learns the facts and the resulting sentiment is a factor so controlling that the strike or lockout rarely comes.

## President Wilson's Business Views

Within the past week President Wilson has given expression to views on the business situation which appear to be of sufficient importance to place on record in these columns. Unfortunately, they indicate that he fails to grasp the seriousness of existing conditions.

On Thursday he gave a hearing to representatives of the National Implement and Vehicle Manufacturers' Association, Ohio Manufacturers' Association and Illinois Manufacturers' Association, who presented a petition urging that after the passage of a trade commission bill no more business legislation be enacted until the country has had time to become acquainted with it. The President in his reply stated that it had become evident that a policy such as is now being pursued "was absolutely necessary to satisfy the conscience of the country and its perception of the prevailing conditions of business, and that it was a great deal better to do the thing moderately and soberly now than to wait until more radical forces had accumulated and it was necessary to go much further." He also said that while he was aware of the present depression of business "there was abundant evidence that it was merely psychological; that there is no substantial reason why the business of the country should not be in the most prosperous and expanding condition."

On Monday of this week, in an interview with representatives of the press, the President made the statement that the business depression is confined to industries closely connected with the railroads. This depression, he thinks, "emanates from the great railroad offices, alarming industries that are really prospering." This depression, he told his callers, had resulted so far in a considerable contraction in sales, as the roads were not buying heavily. While he refused positively to discuss the 5 per cent. rate case as such, his reference to the railroads was taken to mean that he felt—what he was understood to feel some months ago—that substantial increases in railroad earnings should be allowed and that those increases would react beneficially on the money markets and industries of the country. With an apparent endeavor to create a feeling of optimism, he quoted Judge Gary as having said that the outlook for steel was excellent and stated that such a remark from such a source was extremely encouraging. Our readers will recall, however, that what Judge Gary said was that we are six months nearer the dawn of prosperity than we were last fall.

It is painfully evident from these deliverances that little sympathy for business men is thus far felt by the head of the nation. It is to be hoped that he may soon find among his counselors some one able to convince him that the country is actually suffering and that it will continue to suffer until punitive legislation ceases.

The Westinghouse Machine Company has sold Corliss engines and generators formerly used in the Interborough power house at the foot of East Seventy-fourth street, to John Leonard & Co., Inc., 149 Broadway, New York, for approximately \$50,000. The iron and steel parts weigh about 5000 tons, in addition to which are about 150,000 lb. of copper wire, 50,000 lb. of brass bearings and 50,000 lb. of babbitt metal.

## Philadelphia Rapid Transit Plans

City Transit Director Taylor of Philadelphia made public May 27 the terms of the tentative agreement between the city and the Rapid Transit Company, under which it is proposed to construct a modern high speed system of subway and elevated lines for rapid transit. The programme provides for the expenditure of \$63,000,000.

Under the terms of the agreement, Philadelphia ventures into the field of municipal ownership. The city will undertake the following building programme:

	Estimated cost
Frankford elevated (structure).....	\$6,510,000
Darby elevated (structure).....	4,330,000
Broad street subway—delivery loop and extensions (structures).....	34,682,000
Total .....	\$45,582,000

The Rapid Transit Company will furnish the following equipment:

	Estimated cost
Frankford and Darby elevated (equipment).....	\$6,603,000
Broad street subway (equipment).....	7,393,000
Total .....	\$11,996,000

A private corporation would build a tube under the Delaware River to Camden at a cost of \$6,000,000. The plan provides that the equipment of the city-built lines shall be surrendered to the city at the end of 50 years; and that after preferential payments have been made, credit shall be allowed the city covering the cumulative interest and sinking fund on the city's investment.

## Cleveland-Cliffs Company Buys Republic Mine

Considerable interest is taken in iron and steel circles in the purchase of the Republic mine on the Marquette range by the Cleveland-Cliffs Iron Company from the Cambria Steel Company. The mine is located at Republic, 35 miles south of Marquette. The purchase price was \$600,000 and this includes a stock pile of 75,000 tons of ore, about 3000 acres of land in fee and 1500 acres of timber land in addition to power plants, company houses and a waterpower development at Lake Michigamme, 15 miles from the mine. While it is quite unusual for a steel company to dispose of its iron-ore holding, the sale of the Republic mine has no special significance in this respect. The Cambria Steel Company no longer cared for the Republic ore in its mixture, the deposit was getting more expensive to mine, it is located at a remote distance from the steel company's extensive mining operations on the Menominee range and the company preferred to devote its attention to and invest its money in the development of soft ore properties. The Cleveland-Cliffs Company, on the other hand, has its headquarters at Ishpeming, not far from the Republic mine, and because of its location the mine can be very advantageously operated by this company. The output of the mine last year was 137,063 tons. The mine, which has been operated double turn four days a week, will hereafter be operated single turn six days a week.

A trade arrangement has recently been made between William Jacks & Co., Glasgow, Scotland, iron and steel merchants, and the firm of B. Nicoll & Co., 149 Broadway, New York. It covers transactions in iron and steel, coal and other products. Sales made by William Jacks & Co. involving shipments into the United States will be made through B. Nicoll & Co., as will also any purchases in this country for export. In a similar way William Jacks & Co. will represent B. Nicoll & Co. abroad.

The fifth conference of the Chicago Council of the National Council for Industrial Safety discussed means for securing additional safety in the operation of punch and stamping presses. Samuel A. Harper, attorney for the Illinois Liability Commission, gave the principal address. J. J. Heelan presented stereopticon views of a variety of safety guards and in addition there were on exhibition models of presses fitted with different types of protecting devices.



### American Machinery for a Chinese Arsenal

The Niles-Bement-Pond Company, 111 Broadway, New York City, has been awarded a contract amounting to over \$1,000,000 by the Chinese Government for the equipment of a small arms arsenal at Hanyang, near Hankow, China. The machines will be built at the Pratt & Whitney Works at Hartford, Conn., in a special department devoted exclusively to the manufacture of this type of machinery.

The contract calls for sufficient equipment to produce 100 complete army rifles per day and a considerable amount of other military equipment. This includes metal, wood and leather working machinery, fixtures, gauges, etc., and all parts must be made accurately so that they will be absolutely interchangeable. Under the present conditions in China 90 hr. is required to produce a complete rifle, while with the new equipment the guaranteed time of production is less than 23 hr. The scarcity of skilled labor has been given careful consideration in the design of this machinery, as the plans for the arsenal are such that no one man will perform more than one or two simple operations. Experienced engineers and gun makers from the Pratt & Whitney shop will instruct the Chinese workmen after the equipment is installed, and it is expected they will soon become proficient on the particular class of the work assigned them.

The Pratt & Whitney Company has equipped Government arsenals in England, Germany, France, Australia and Belgium, as well as at Springfield, Mass., and Rock Island, Ill. Various other works of the Niles-Bement-Pond Company make a specialty of machinery for the manufacture of ordnance and armor plate. A gun lathe for machining ordnance up to 16-in. bore has recently been shipped to Austria, ten freight cars being required to carry this one machine from the plant in Philadelphia to the point of shipment. Several of these large gun lathes have been built for the Italian Government arsenals, and a number of the very large lathes, boring and turning mills and planing machines have recently been shipped to England, France and Germany, a recent shipment to the second country including the largest boring and turning mill ever exported from the United States. At the present time a 36-ft. boring and turning mill, which is the largest of its kind ever built in this country, if not in the world, that will be used for machining the tracks upon which warship turrets run, is being set up at the Brooklyn Navy Yard. This machine weighs 600,000 lb. and 13 large freight cars were required to carry the various parts. The company has also received recent orders from abroad for a large number of railway wheel and axle machines as well as machine shop equipment.

The Thurlow Steel & Foundry Company, Chester, Pa., has elected the following officers: President, Daniel C. Eagan; first vice-president, John I. Rogers; second vice-president, A. P. Witteman; secretary, J. Elliott Newlin; treasurer, Carl N. Martin. The company, which has been recently organized, has acquired the plant formerly operated by the A. P. Witteman Company. Extensive improvements have been made and it is expected that operations will begin about June 10. The company will specialize in crank shafts, piston rods, engine forgings, die blocks, locomotive and car forgings and ship and marine forgings and castings, either rough or machined. The plant will be under the direct management of John I. Rogers.

Seattle's first combination gold and tin dredge, a machine which it is thought will greatly advance the dredging industry in Alaska, has been completed by the American Dredge Building & Construction Company, Seattle, Wash., and will be shipped to York, Alaska, June 25. The machine was constructed at the yards of the Queen City Iron Works, and is the first of its kind to be manufactured of manganese steel throughout, with the exception of the hull, which is of Washington fir. It is estimated that this dredge will save about 25 per cent. of the time in operation, which in a place where the mining season is limited to approximately 100 days, will considerably increase the production.

### CONTENTS

Cost Keeping in a Jobbing Foundry.....	1381
Effective Pipe Insulation.....	1383
Protective Welding Helmet.....	1384
A 5-Ft. Heavy Radial Drilling Machine.....	1385
Progress in the Smelting of Mayari Ore.....	1386
Colombia's Resources and Possibilities.....	1390
A Rotary Small Tube Swaging Machine.....	1393
A Large Planing Machine.....	1394
Improved Method for Checking the Pyrometer.....	1395
Greatest Coke Production.....	1395
Iron, Steel and Heavy Hardware Convention.....	1396
Jobbers on the Keeping of Steel Contracts.....	1398
Providing a Shop Drinking Water System.....	1400
Results of Applied Scientific Management.....	1402
A 20-In. Drilling Machine.....	1405
Economical Collar and Washer Production.....	1406
Standard Welding Company's Success.....	1409
A Motor-Driven Jolt Ramming Machine.....	1409
First Exhibit Installed in Machinery Hall, San Francisco.....	1409
New Electrical Manufacturing Plant.....	1410
Buffalo Furnaces Refused Lower Coke Rate.....	1411
Shall Unions Have Special Privileges?.....	1412
To Increase "Independent" Steel Exports.....	1413
Labor Questions and Publicity.....	1413
President Wilson's Business Views.....	1414
Philadelphia Rapid Transit Plans.....	1414
Cleveland-Cliffs Company Buys Republic Mine.....	1414
American Machinery for a Chinese Arsenal.....	1415
New York State Manufacturers' Association.....	1415
Sharp Curtailment.....	1416
The Jones Pig-Iron Mixer Case.....	1417
Blast Furnace Notes.....	1417
The Iron and Metal Markets.....	1418
Customs Decision on Iron Castings.....	1430
Judicial Decisions.....	1431
The National Foreign Trade Convention.....	1432
American and British Machinery Exports.....	1434
Important to Scale Manufacturers.....	1435
Tendency Toward Silence.....	1436
A New Turbine Cleaner for Boiler Tubes.....	1436
Book Review.....	1437
High-Speed Upright Drilling Machine.....	1437
Pittsburgh and Nearby Districts.....	1438
Special Pig-Iron Statistics for 1913.....	1438
Personal.....	1439
Obituary.....	1439
The Bookkeeping of Manufacturing Costs.....	1440
An Improved Form of Hot Blast Heater.....	1442
The Machinery Markets.....	1444
Trade Publications.....	1450

### New York State Manufacturers' Association

The annual meeting of the New York State Manufacturers' Association was held at Syracuse, May 28. The election of officers for the coming year resulted as follows: President, Carlton A. Chase, president Syracuse Chilled Plow Company; first vice-president, John L. Harper, Niagara Falls; second vice-president, Andrew Frey, Utica; secretary and treasurer, A. C. Odell, Trust Company Building, Poughkeepsie. Directors: John A. Kernan, Utica; H. W. Cook, Syracuse; N. J. Gould, Seneca Falls; T. H. Miller, Poughkeepsie; H. F. Searle, Cohoes; John H. Eilers, Lockport; C. A. Starbuck, Watertown; A. B. Ireland, Binghamton; L. P. Hubbell, Buffalo; D. E. Clapp, Auburn, and Walter W. Cheney, Manlius.

Plans have been made for a joint meeting of committees representing the association and the Associated Industries, a new organization in the Western part of the State, to discuss the possibility of an amalgamation of the two bodies. A. H. G. Hardwicke, Niagara Falls, heads the Manufacturers' Committee.

Those interested in learning of the objects and achievements of the association should address the secretary, A. C. Odell, at Poughkeepsie.

SHARP CURTAILMENT

A Net Loss of 14 Blast Furnaces

Pig-Iron Output in May 8000 Tons a Day Less Than in April

The falling off in pig-iron production in May was marked. The total for the month was 2,092,686 gross tons, or 67,506 tons a day, against 2,269,955 tons, or 75,665 tons a day in April. The May production was thus at practically the rate of February, which was about 6600 tons a day above the extremely low point reached in January. Eighteen furnaces were blown out last month and only four were blown in, making a net loss of 14, added to 18 in April. The capacity of the 197 furnaces active on June 1 was 64,514 tons a day, against 70,595 tons a day for the 211 furnaces active one month previous. Pig iron is now being produced at close to the rate of December, which was 63,987 tons a day.

DAILY RATE OF PRODUCTION

The daily rate of production of coke and anthracite pig iron by months, from May, 1913, is as follows:

Daily Rate of Pig-Iron Production by Months—Gross Tons			
	Steel works	Merchant	Total
May, 1913	64,232	26,807	91,039
June	62,002	25,617	87,619
July	59,362	23,239	82,601
August	59,140	22,981	82,121
September	60,941	22,590	83,531
October	59,630	22,503	82,133
November	52,434	22,019	74,453
December	41,879	22,108	63,987
January, 1914	40,691	20,117	60,808
February	47,479	19,974	67,453
March	54,990	20,748	75,738
April	54,508	21,157	75,665
May	47,028	20,478	67,506

OUTPUT BY DISTRICTS

The accompanying table gives the production of all coke and anthracite furnaces in May and the three months preceding:

Monthly Pig-Iron Production—Gross Tons				
	Feb. (28 days)	Mar. (31 days)	Apr. (30 days)	May (31 days)
New York	100,802	135,166	144,200	137,853
New Jersey	10,155	9,997	10,868	10,880
Lehigh Valley	66,377	77,616	75,072	65,590
Schuylkill Valley	41,071	49,207	68,436	49,779
Lower Susquehanna and Lebanon Valley	32,751	37,921	41,493	41,124
Pittsburgh district	473,108	570,648	529,371	491,660
Shenango Valley	102,590	141,469	125,756	104,414
Western Pennsylvania, Maryland, Virginia and Kentucky	30,235	60,305	61,694	61,223
Wheeling district	92,076	123,113	113,467	86,128
Mahoning Valley	174,692	229,923	241,264	222,207
Central and Northern Ohio	164,741	187,110	167,920	151,501
Hanging Rock and S. W. Ohio	30,389	33,414	34,058	35,361
Chicago district	245,719	317,603	305,718	301,526
Mich., Minn., Mo., Wis. and Col.	63,145	78,560	75,680	66,242
Alabama	136,378	159,883	142,985	151,292
Tennessee	16,594	18,761	18,004	15,769
Total	1,888,670	2,347,867	2,269,955	2,092,686

PRODUCTION OF STEEL COMPANIES

Returns from all furnaces of the United States Steel Corporation and the various independent steel companies show the following totals of product month by month. Only steel-making iron is included in these figures, together with ferromanganese, spiegeleisen and ferrosilicon. These last, while stated separately, are also included in the columns of "total production."

Production of Steel Companies—Gross Tons				
	Pig, total production			Spiegeleisen, etc.
	1912	1913	1914	1912 1913 1914
Jan.	1,483,153	1,981,560	1,261,430	22,622 15,633 17,325
Feb.	1,550,995	1,792,154	1,329,414	15,950 20,131 10,524
Mar.	1,827,792	1,904,878	1,704,688	11,538 20,546 20,133
Apr.	1,830,717	1,939,751	1,635,226	11,104 23,108 18,676
May	1,922,557	1,991,192	1,457,847	20,518 19,042 21,504
June	1,823,958	1,860,070	.....	26,685 19,212 .....
July	1,803,205	1,840,216	.....	26,522 22,310 .....
Aug.	1,843,404	1,833,352	.....	24,225 20,680 .....
Sept.	1,773,073	1,828,232	.....	22,484 24,555 .....
Oct.	1,947,426	1,848,634	.....	27,252 19,499 .....
Nov.	1,884,524	1,573,007	.....	17,461 26,765 .....
Dec.	1,976,870	1,298,262	.....	18,523 14,095 .....

CAPACITY IN BLAST JUNE 1 AND MAY 1

The following table shows the daily capacity, in gross tons, of furnaces in blast June 1 and May 1, by districts:

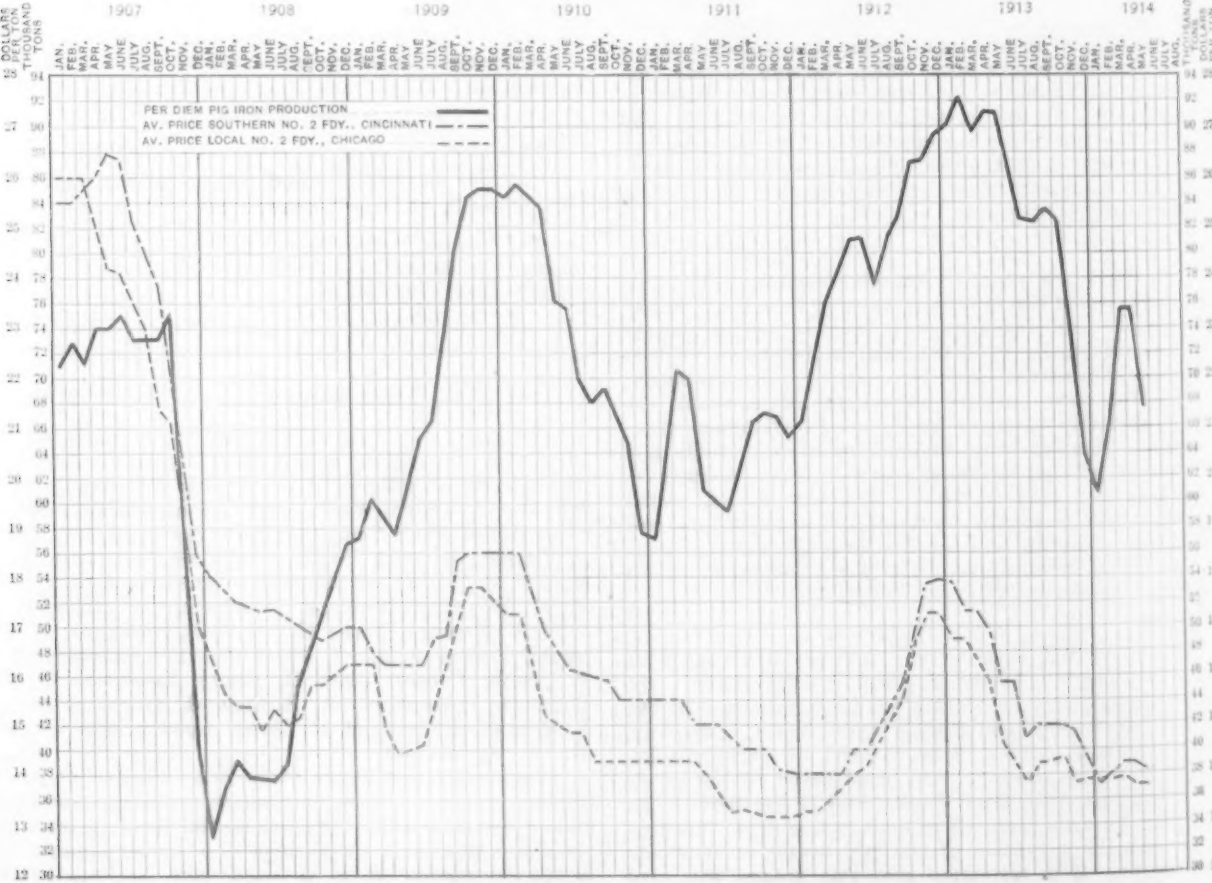


Diagram of Daily Average Production by Months of Coke and Anthracite Pig Iron in the United States from January 1, 1907, to June 1, 1914: Also of Monthly Average Prices of Southern No. 2 Foundry Iron at Cincinnati and Local No. 2 Foundry Iron at Chicago District Furnace

Coke and Anthracite furnaces in Blast

Location of furnaces	Total number of stacks	June 1		May 1	
		Number in blast	Capacity per day	Number in blast	Capacity per day
New York:					
Buffalo .....	19	10	3,675	13	4,576
Other New York ..	7	3	505	2	350
New Jersey .....	7	2	351	2	362
Pennsylvania:					
Lehigh Valley ..	22	7	1,975	6	1,885
Spiegel .....	2	2	172	2	166
Schuylkill Val. ..	16	8	2,251	8	2,281
Lower Susquehanna ..	7	2	485	3	709
Lebanon Valley ..	10	4	643	4	674
Pittsburgh Dist. ..	52	31	13,315	34	15,485
Spiegel .....	4	3	367	2	262
Shenango Val. ....	19	8	2,435	10	3,155
Western Pa. ....	27	14	4,195	13	3,799
Maryland .....	4	2	875	2	856
Wheeling District ..	14	7	2,662	8	2,942
Ohio:					
Mahoning Val. ....	25	17	6,985	18	7,495
Central and Northern ..	24	11	4,310	13	5,170
Hanging Rock & S. W. Ohio ..	15	8	1,085	9	1,135
Illinois and Ind. ....	34	20	9,520	21	10,015
Spiegel .....	2	1	115	1	156
Michigan, Wis. & Minn. ....	10	5	1,308	7	1,813
Colorado and Mo. ....	8	2	701	2	709
The South:					
Virginia .....	24	7	872	7	826
Kentucky .....	5	2	325	2	385
Alabama .....	46	18	4,878	18	4,855
Tennessee .....	20	4	509	4	534
Total .....	423	197	64,514	211	70,595

Among furnaces blown out last month were Buffalo Union C, one Wickwire and one Susquehanna at Buffalo, No. 2 Pennsylvania Steel Company at Steelton (banked), one Donora and No. 3 Duquesne in the Pittsburgh district, New Castle No. 1 and Farrell No. 3 in the Shenango Valley, No. 1 La Belle in the Wheeling district, No. 5 Ohio and No. 3 Hazleton in the Mahoning Valley, one Central and one Cleveland in northern Ohio, one Wellston in the Hanging Rock district, one South Chicago in the Chicago district, one Mayville in Wisconsin. Midland, in the Pittsburgh district, was blown out April 29, but was not so reported one month ago.

Only four furnaces were blown in last month—Genesee in New York, Carbon in the Lehigh Valley (after being banked 17 days), No. 5 Cambria in western Pennsylvania and Mattie in the Mahoning Valley.

DIAGRAM OF PIG-IRON PRODUCTION AND PRICES

The fluctuations in pig-iron production from January, 1907, to the present time are shown in the accompanying chart. The figures represented by the heavy lines are those of daily average production, by months, of coke and anthracite iron. The two other curves on the chart represent monthly average prices of Southern No. 2 foundry pig iron at Cincinnati and of local No. 2 foundry iron at furnace at Chicago. They are based on the weekly market quotations of *The Iron Age*. The figures for daily average production are as follows:

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since January 1, 1907—Gross Tons								
	1907	1908	1909	1910	1911	1912	1913	1914
Jan.	71,149	33,918	57,975	84,148	56,752	66,384	90,172	60,808
Feb.	73,038	37,163	60,976	85,616	64,090	72,442	92,369	67,453
Mar.	71,821	39,619	59,232	84,459	70,036	77,591	89,147	75,738
Apr.	72,885	38,289	57,962	82,792	68,836	79,181	91,759	75,665
May	74,048	37,603	60,753	77,102	61,079	81,051	91,039	67,506
June	74,486	36,444	64,656	75,516	59,585	81,358	87,619	.....
July	72,763	39,287	67,793	69,305	57,841	77,738	82,601	.....
Aug.	72,594	42,851	72,546	67,963	62,150	81,046	82,057	.....
Sept.	72,783	47,300	79,507	68,476	65,903	82,128	83,531	.....
Oct.	75,286	50,554	83,856	67,520	67,811	86,722	82,133	.....
Nov.	60,927	51,595	84,917	63,659	66,648	87,697	74,453	.....
Dec.	39,815	56,158	85,022	57,349	65,912	89,766	63,987	.....

THE RECORD OF PRODUCTION

Production of Coke and Anthracite Pig Iron in the United States by Months Since January 1, 1910—Gross Tons					
	1910	1911	1912	1913	1914
Jan.	2,608,605	1,759,326	2,057,911	2,795,331	1,885,054
Feb.	2,397,254	1,794,509	2,100,815	2,586,337	1,888,670
Mar.	2,617,949	2,171,111	2,405,318	2,763,563	2,347,867
Apr.	2,483,763	2,064,086	2,375,436	2,752,761	2,269,955
May	2,390,180	1,893,456	2,512,582	2,822,217	2,092,686
June	2,265,478	1,787,566	2,440,745	2,628,565	.....
July	2,148,442	1,793,068	2,410,889	2,560,646	.....
Aug.	2,106,847	1,926,637	2,512,431	2,545,763	.....
Sept.	2,056,275	1,997,102	2,463,839	2,505,927	.....
Oct.	2,093,121	2,102,147	2,689,933	2,546,261	.....
Nov.	1,909,780	1,999,433	2,630,854	2,233,123	.....
Dec.	1,777,817	2,043,270	2,782,737	1,983,607	.....

The Jones Pig-Iron Mixer Case

In the United States District Court in Pittsburgh last week, a decree was rendered in the infringement suit of the Carnegie Steel Company against the Cambria Iron Company, Johnstown, Pa. This is the famous suit, filed in 1896 by the Carnegie Steel Company, involving the use of the Jones mixer, invented by the late Capt. W. R. Jones, general manager of the Edgar Thomson works of the Carnegie Steel Company. The mixer is used for the purpose of mixing the different casts of pig iron for the steel converters and also as a reservoir for pig iron. The patent expired some years ago. The Cambria Iron Company now leases its property to the Cambria Steel Company and the latter company is ordered to pay to the Carnegie Steel Company \$568,305.93, with interest from May 1, 1912, to the date of payment. The defendant is also ordered to pay the costs of the suit. The decree sets aside the report of the master in the suit, substituting the conclusions and findings of the Court filed April 1, 1914. All exceptions to the master's report filed by either party to the suit inconsistent with the findings referred to are overruled by the decree. The suit was filed in 1896, and argued before Judge Joseph Buffington during its various stages of progress to the present time. At this writing it is not known whether or not the Cambria Steel Company will appeal to a higher court.

Blast Furnace Notes

No. 1 New Castle furnace of the Carnegie Steel Company at New Castle, Pa., blew out on May 30. Three furnaces were blown out in the Buffalo district in May: One Buffalo Union, one Wickwire and one Susquehanna. In the Pittsburgh district 33 furnaces were active on June 1. Two were blown out in May, one Donora and one Duquesne. The Midland furnace of the Pittsburgh Crucible Steel Company was blown out April 29. The Cambria Steel Company had seven furnaces in blast on June 1 as against six on May 1. No. 5 furnace, after relining, was blown in May 28. No. 2 furnace is being rebuilt.

The Parr Shoals Power Company's new hydroelectric development near Columbia, S. C., recently completed by the J. G. White Engineering Corporation, New York, was officially opened on Decoration Day. The power company is a subsidiary of the Columbia Railway, Gas & Electric Company, and the new plant supplements the steam and hydroelectric stations of the parent company, which are rated at 14,500 hp. The new station comprises a concrete dam 2200 ft. long across the Broad River, about 30 miles above Columbia, with a fireproof power house. Provision has been made for the eventual development of about 30,000 hp. The present installation comprises five units, operating at 35 ft. head, which will generate 18,000 hp.

The Du Puy Machine Screw Company, recently incorporated, has equipped a plant at the Bush Terminal, Brooklyn, N. Y., and will specialize in the manufacture of general screw-machine products of all descriptions from iron, steel, brass or special stock. Thomas F. Du Puy, president of the company, was connected for several years with the National-Acme Mfg. Company, Cleveland, Ohio, and is at present New York representative of the Windsor Machine Company, Windsor, Vt., builder of the Gridley automatic screw machines and automatic turret lathes. Charles Shults, of the New York office of the Coatesville Rolling Mill Company, is secretary and treasurer.

There is as yet no official confirmation of the reported sale of 10,000 tons of Southern iron for delivery at Vancouver and of arrangements for its shipment from Savannah via Panama Canal. Another report put the amount sold at 500 tons.



# The Iron and Metal Markets

## LARGE SALES OF PIG IRON

### A Pipe Interest Takes 100,000 Tons

#### Blast Furnace Curtailment Marked—Possibilities of June Buying

Large buying of pig iron by a leading cast-iron pipe interest has been the significant development of the week. It is estimated that 100,000 tons was involved, three Southern interests getting the bulk of it, though several round lots went to Northern furnaces. It is understood that much of this business went at a \$10.25, Birmingham, basis for No. 2 foundry and that in one case an offer of \$10 for 35,000 tons was refused. Further sales of Southern iron have been made for export to the Mediterranean, one of 10,000 tons being at \$10.25, Birmingham, for No. 2.

There has been some activity in Southern basic iron also, one interest closing 12,000 tons in the week. Recent sales of basic iron at Chicago, amounting to 75,000 tons, have taken care of important St. Louis and Chicago requirements for several months ahead. It is evident that a number of large interests have regarded recent pig-iron prices as at or near bottom.

The recent drift in both iron and steel operations is well indicated by our statistics of pig-iron production in May. At 2,092,686 tons, or 67,506 tons a day, the month's output was over 8000 tons a day less than that of April, which was 2,269,955 tons. Steel works furnaces lead in the curtailment. The net loss in active stacks is 14 for May, or a total of 32 in the past two months.

The 197 furnaces active on June 1 represented 64,514 tons a day, or slightly more than the rate of pig-iron production in December, showing that practically all that the industry gained since early January has been lost. Production last month was at the rate of less than 25,000,000 tons a year, against 28,000,000 tons in April. Today it is less than 24,000,000 tons a year. In May, 1913, it was 33,500,000 tons. The falling off in a year is about 30 per cent.

What encouragement it finds, the steel trade is largely drawing from expected developments. But in a few lines there are signs of better buying. In May most steel works were on a 55 per cent. basis in ingot output, and buying was at low point for the year thus far. June, in the view of some leaders in the trade, will bring the beginning of another January movement.

The Steel Corporation's orders at the end of May showed another heavy falling off, which has been estimated at 300,000 to 400,000 tons, or practically equal to that of April.

Action on the Pennsylvania Railroad rail orders for 1914 is looked for daily. The company having already placed 20,000 tons with the Pennsylvania and Cambria mills, its further purchases may not exceed 100,000 tons, whereas a total of 150,000 tons had been expected. The Seaboard Air Line's order was 17,000 tons, as anticipated.

On 750 steel cars bought by the Lackawanna Railroad the low bid was \$25 a car less than that of a leading builder. The Illinois Central's 3000 cars, long pending, are now taken as arranged for.

The structural contracts of the week include 2450 tons for the Northern Pacific's Green River viaduct and 2000 tons for the new Bethlehem coke ovens. There is still lacking the movement which commonly comes from the combination of cheap money and cheap steel.

Bar iron in a few cases has displaced steel in recent competition in Eastern markets, where the bar iron delivered price is close to that in the Pittsburgh district. Concrete work has brought out aggressive selling of steel bars, and 1.12c., Pittsburgh, has been done on corrugated bars.

Coke contracts for the year beginning July 1 have been made by some Chicago district furnaces. One interest has closed for 26,000 tons a month, one-half by-product and one-half Connellsville coke. Of the former 6500 tons a month from September up to July 1, 1915, will be furnished from Joliet and a like amount from Indianapolis. The price is equivalent to about \$1.90 at Connellsville ovens.

Lake Superior ore shipments in May amounted to 3,852,063 tons, against 7,284,212 tons in May, 1913.

## A Comparison of Prices

Advances Over the Previous Week in Heavy Type,  
Declines in Italics

At date, one week, one month, and one year previous

Pig Iron, Per Gross Ton:	June 3, 1914.	May 27, 1914.	May 6, 1914.	June 4, 1913.
No. 2 X, Philadelphia..	\$14.75	\$14.75	\$15.00	\$16.50
No. 2, Valley furnace...	13.00	13.00	13.00	14.25
No. 2 Southern, Cin'ti...	13.75	13.75	13.75	14.25
No. 2, Birmingham, Ala.	10.50	10.50	10.50	11.00
No. 2, furnace, Chicago*	14.00	14.00	14.25	16.00
Basic, del'd, eastern Pa.	14.00	14.00	14.25	16.50
Basic, Valley furnace...	13.00	13.00	13.00	14.50
Bessemer, Pittsburgh...	14.90	14.90	14.90	17.50
Malleable Bess., Ch'go*	14.00	14.00	14.25	16.00
Gray forge, Pittsburgh..	13.65	13.65	13.65	14.90
L. S. charcoal, Chicago.	15.75	15.75	15.75	17.50

Billets, etc., Per Gross Ton:	June 3, 1914.	May 27, 1914.	May 6, 1914.	June 4, 1913.
Bess. billets, Pittsburgh.	20.00	20.00	20.00	26.50
O.-h. billets, Pittsburgh..	20.00	20.00	20.00	26.50
O.-h. sheet bars, P'gh...	21.00	21.00	21.00	27.00
Forging billets, base, P'gh.	25.00	25.00	25.00	34.00
O.-h. billets, Phila.....	22.40	22.40	22.40	28.00
Wire rods, Pittsburgh...	24.50	24.50	26.00	30.00

Old Material, Per Gross Ton:	June 3, 1914.	May 27, 1914.	May 6, 1914.	June 4, 1913.
Iron rails, Chicago.....	12.75	12.75	12.75	15.75
Iron rails, Philadelphia...	15.00	15.00	15.50	18.00
Carwheels, Chicago.....	11.50	11.50	11.50	14.25
Carwheels, Philadelphia..	11.25	11.75	11.75	13.50
Heavy steel scrap, P'gh...	11.50	11.50	11.50	13.00
Heavy steel scrap, Phila.	10.50	10.75	10.50	12.00
Heavy steel scrap, Ch'go	9.50	9.50	10.00	10.50
No. 1 cast, Pittsburgh...	11.50	11.50	11.50	13.25
No. 1 cast, Philadelphia..	12.00	12.00	12.50	13.50
No. 1 cast, Ch'go (net ton)	9.75	10.00	10.25	11.00

Finished Iron and Steel, Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Bess. rails, heavy, at mill	1.25	1.25	1.25	1.25
Iron bars, Philadelphia...	1.20	1.20	1.20	1.51½
Iron bars, Pittsburgh...	1.25	1.25	1.30	1.70
Iron bars, Chicago.....	1.10	1.10	1.10	1.50
Steel bars, Pittsburgh...	1.12½	1.12½	1.15	1.70
Steel bars, New York...	1.28½	1.28½	1.31	1.86
Tank plates, Pittsburgh.	1.10	1.10	1.15	1.60
Tank plates, New York.	1.26	1.26	1.31	1.76
Beams, etc., Pittsburgh..	1.12½	1.12½	1.15	1.50
Beams, etc., New York.	1.28½	1.28½	1.31	1.66
Skelp, grooved steel, P'gh	1.20	1.20	1.20	1.45
Skelp, sheared steel, P'gh	1.25	1.25	1.25	1.50
Steel hoops, Pittsburgh..	1.25	1.25	1.25	1.60

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, P'gh	1.85	1.85	1.85	2.30
Galv. sheets, No. 28, P'gh	2.75	2.75	2.85	3.40
Wire nails, Pittsburgh...	1.50	1.55	1.60	1.80
Cut nails, Pittsburgh...	1.55	1.60	1.65	1.70
Fence wire, base, P'gh...	1.30	1.35	1.40	1.60
Barb wire, galv., P'gh...	1.90	1.95	2.00	2.20

\*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Coke, Connellsville,

	June 3, 1914.	May 27, 1914.	May 6, 1914.	June 4, 1913.
Per Net Ton at Oven:				
Furnace coke, prompt...	\$1.75	\$1.75	\$1.85	\$2.15
Furnace coke, future...	1.90	1.90	2.00	2.25
Foundry coke, prompt...	2.40	2.40	2.40	2.85
Foundry coke, future...	2.50	2.50	2.50	3.00

Metals.

	Cents.	Cents.	Cents.	Cents.
Per lb. to Large Buyers:				
Lake copper, New York.	14.25	14.37½	14.50	15.75
Electrolytic copper, N. Y.	14.00	14.12½	14.20	15.25
Spelter, St. Louis.....	4.95	4.95	4.85	5.15
Spelter, New York.....	5.10	5.10	5.00	5.30
Lead, St. Louis.....	3.80	3.80	3.80	4.20
Lead, New York.....	3.90	3.90	3.90	4.35
Tin, New York.....	30.45	33.25	33.10	46.60
Antimony, Hallett's, N. Y.	6.87½	6.80	6.75	8.20
Tin plate, 100-lb. box, 17" gh.	\$3.30	\$3.30	\$3.30	\$3.60

Finished Iron and Steel f. o. b. Pittsburgh

Freight rates from Pittsburgh, in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Louis, 22½c.; Kansas City, 21½c.; Omaha, 42½c.; St. Paul, 32c.; Denver, 84½c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific coast, 20c. on plates, structural shapes and sheets No. 11 and heavier; 85c. on sheets Nos. 12 to 16; 95c. on sheets No. 16 and lighter; 65c. on wrought pipe and boiler tubes.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.10c. to 1.15c., base, net cash, 30 days. Following are stipulations prescribed by manufacturers with extras:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼ in. and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per sq. ft., are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼ in. thick on edge, or not less than 11 lb. per sq. ft., to take base price. Plates over 72 in. wide ordered less than 11 lb. per sq. ft. down to the weight of 3-16 in. take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Extras	Cents per lb.
Gauges under ¼ in. to and including 3-16 in.	.10
Gauges under 3-16 in. to and including No. 8.	.15
Gauges under No. 8 to and including No. 9.	.25
Gauges under No. 9 to and including No. 10.	.30
Gauges under No. 10 to and including No. 12.	.40
Sketches (including straight taper plates), 3 ft. and over	.10
Complete circles 3 ft. in diameter and over	.20
Boiler and flange steel	.10
"A. F. M. A." and ordinary firebox steel	.20
Still bottom steel	.30
Marine steel	.40
Locomotive firebox steel	.50
Widths over 100 in. up to 110 in., inclusive	.05
Widths over 110 in. up to 115 in., inclusive	.10
Widths over 115 in. up to 120 in., inclusive	.15
Widths over 120 in. up to 125 in., inclusive	.25
Widths over 125 in. up to 130 in., inclusive	.50
Widths over 130 in.	1.00
Cutting to lengths, under 3 ft., to 2 ft. inclusive	.25
Cutting to lengths, under 2 ft., to 1 ft. inclusive	.50
Cutting to lengths, under 1 ft.	1.55

No charge for cutting rectangular plates to lengths 3 ft. and over.

Structural Material.—I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in. on one or both legs, ¼ in. thick and over, and zees, 3 in. and over, 1.12½c. to 1.15c. Extras on other shapes and sizes are as follows:

	Cents per lb.
I-beams over 15 in.	.10
H-beams over 18 in.	.10
Angles over 6 in. on one or both legs	.10
Angles, 3 in. on one or both legs, less than ¼ in. thick, as per steel bar card, Sept. 1, 1909	.70
Tees, structural sizes (except elevator, hand rail, car truck and conductor rail)	.05
Channels and tees, under 3 in. wide, as per steel bar card, Sept. 1, 1909	.20 to .80
Deck beams and bulb angles	.10
Hand rail tees	.15
Cutting to lengths, under 3 ft. to 2 ft. inclusive	.25
Cutting to lengths, under 2 ft. to 1 ft. inclusive	.50
Cutting to lengths, under 1 ft.	1.55

No charge for cutting to lengths 3 ft. and over.

Wire Products.—Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days or 2 per cent. discount in 10 days, carload lots to jobbers, annealed, \$1.30 to \$1.35; galvanized, \$1.70 to \$1.75. Galvanized barb wire and fence staples to jobbers, \$1.90 to \$1.95; painted, \$1.50 to \$1.55. Wire nails to jobbers, \$1.50 to \$1.55. Woven wire fencing, 73½ per cent. off list for carloads; 72½ off for 1000-rod lots; 71½ off for less than 1000-rod lots.

The following table gives the price to retail mer-

chants on fence wire in less than carloads, with the extras added to the base price:

Nos.	0 to 9	10	11	12	13	14	15	16
Annealed	\$1.50	\$1.55	\$1.60	\$1.65	\$1.75	\$1.85	\$1.95	\$2.05
Galvanized	1.95	1.95	2.00	2.05	2.15	2.25	2.35	2.75

Wire Rods.—Bessemer, open-hearth and chain rods, \$24.50 to \$25.

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on steel pipe in effect from April 20, 1914, and iron pipe from June 2, 1913, all full weight:

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
1½, 1¼ and ¾	73	52½	1½ and 1¼	66	47
1½	77	66½	¾	65	46
1½ to 3	80	71½	1½	69	56
			¾ to 2½	72	61
Lap Weld					
1½	77	68½	1½	56	45
1½ to 6	79	70½	1½	67	56
7 to 12	76	65½	2	68	58
13 to 15	53		2½ to 4	70	61
			4½ to 6	70	61
			7 to 12	68	55

Reamed and Drifted		
1 to 3, butt	78	69½
2, lap	75	66½
2½ to 6, lap	77	68½
1 to 1½, butt	70	59
2, butt	70	59
1½, lap	54	43
1½, lap	65	54
2, lap	66	56
2½ to 4, lap	68	59

Butt Weld, extra strong, plain ends		
1½, 1¼ and ¾	68	57½
1½	73	66½
¾ to 1½	77	70½
2 to 3	78	71½
1½	63	52
1½	67	60
¾ to 1½	71	62
2 and 2½	72	63

Lap Weld, extra strong, plain ends		
2	74	65½
2½ to 4	76	67½
4½ to 6	75	66½
7 to 8	68	57½
9 to 12	63	52½
1½	65	55
2½ to 4	66	56
2½ to 4	70	61
4½ to 6	69	60
7 to 8	63	53
9 to 12	58	47

Butt Weld, double extra strong, plain ends		
1½	63	56½
¾ to 1½	66	59½
2 to 2½	68	61½
1½	57	49
¾ to 1½	60	52
2 and 2½	62	54

Lap Weld, double extra strong, plain ends		
2	64	57½
2½ to 4	66	59½
4½ to 6	65	58½
7 to 8	58	47½
2	55	49
2½ to 4	60	54
4½ to 6	59	53
7 to 8	52	42

To the large jobbing trade an additional 5 and 2½ per cent. is allowed over the above discounts. The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

Boiler Tubes.—Discounts to jobbers, in carloads, in effect from May 1, 1914, on steel and from January 2, 1914, on iron, are as follows:

Lap Welded Steel	Standard Charcoal Iron
1½ and 2 in.	62
2½ in.	59
2½ to 2¾ in.	65
3 and 3¼ in.	70
3½ to 4½ in.	72
5 and 6 in.	65
7 to 13 in.	62
1½ in.	45
1½ and 2 in.	49
2½ in.	45
2½ to 2¾ in.	54
3 and 3¼ in.	57
3½ to 4½ in.	60
5 and 6 in.	49

Locomotive and steamship special charcoal grades bring higher prices.

2½ in. and smaller, over 18 ft., 10 per cent. net extra. 2½ in. and larger, over 22 ft., 10 per cent. net extra. Less than carloads will be sold at the delivered discounts for carloads, lowered by two points for lengths 22 ft. and under to destinations east of the Mississippi River; lengths over 22 ft., and all shipments going west of the Mississippi River must be sold f.o.b. mill at Pittsburgh basing discount, lowered by two points.

Sheets.—Makers' prices for mill shipment on sheets of U. S. Standard gauge, in carload and larger lots, on which jobbers charge the usual advance for small lots from store, are as follows, f.o.b. Pittsburgh, terms 30 days net or 2 per cent. cash discount in 10 days from date of invoice:

Blue Annealed Sheets	Cents per lb.
Nos. 3 to 8	1.30
Nos. 9 to 10	1.35
Nos. 11 and 12	1.40
Nos. 13 and 14	1.45
Nos. 15 and 16	1.55

Box Annealed Sheets, Cold Rolled	Cents per lb.
Nos. 10 and 11	1.50 to 1.55
No. 12	1.50 to 1.55
Nos. 13 and 14	1.55 to 1.60
Nos. 15 and 16	1.60 to 1.65
Nos. 17 to 21	1.65 to 1.70
Nos. 22 and 24	1.70 to 1.75
Nos. 25 and 26	1.75 to 1.80
No. 27	1.80 to 1.85
No. 28	1.85 to 1.90
No. 29	1.90 to 1.95
No. 30	2.00 to 2.05

## Galvanized Sheets of Black Sheet Gauge

	Cents per lb.
Nos. 10 and 11.....	1.75 to 1.80
No. 12.....	1.85 to 1.90
Nos. 13 and 14.....	1.85 to 1.90
Nos. 15 and 16.....	2.00 to 2.05
Nos. 17 to 21.....	2.15 to 2.20
Nos. 22 and 24.....	2.30 to 2.35
Nos. 25 and 26.....	2.45 to 2.50
No. 27.....	2.60 to 2.65
No. 28.....	2.75 to 2.80
No. 29.....	2.90 to 2.95
No. 30.....	3.05 to 3.10

## Pittsburgh

PITTSBURGH, PA., June 2, 1914.

Reports as to conditions of trade and the outlook are conflicting. One leading steel interest reports that its specifications in May exceeded April by over 15,000 tons, and yet its operations in May were lighter than in April. Another states that its specifications in May were less than in April, and it regards the outlook for the next two or three months as discouraging. While there is more favorable sentiment in the trade than for some time, as yet this has not increased new orders, and business being entered by the mills is distressingly light. A leading maker of ingot molds reports that its output in May was only about 40 per cent. of its normal capacity, and this gives a very good line on the operations of steel mills, which average not more than 50 per cent. More buying is looked for this month. Some contracts are now being placed on finished lines for third quarter. There is more inquiry for basic and foundry pig iron, but prices continue weak. No billets or sheet bars are being sold on new orders, and the market is purely nominal. While there may be a swell in new demand in June, no permanent betterment in the steel trade is looked for until late in the fall. Prices continue weak, but not enough new business is coming out to test the market. Prices on wire nails are more common at \$1.50 to the large trade. Coke and scrap are neglected.

**Pig Iron.**—W. P. Snyder & Co. report the average price of Bessemer in May to have been \$14 and basic \$13 at Valley furnace, the same as in April. Very little Bessemer or basic was sold in this market in May, and the above prices were derived largely from shipments of iron on old contracts on which prices are adjusted monthly. There is more inquiry for foundry and basic iron, consumers asking prices on 15,000 to 20,000 tons of basic for delivery over the next two or three months. A local steel casting interest is in the market for about 1000 tons of Bessemer. We note sale of about 650 tons of high grade No. 2 foundry iron at \$13.50, Valley furnace. No sales of low-phosphorus pig iron have been made in this market for a long time. We quote: Bessemer iron, nominally, \$14; basic, \$13; No. 2 foundry, \$13 to \$13.50; gray forge, \$12.75, and malleable Bessemer, \$13 to \$13.25, all at Valley furnace, the freight to Pittsburgh and Cleveland being 90c. a ton.

**Billets and Sheet Bars.**—Steel mills report that specifications against contracts for sheet bars from the tin mills are active, but from the sheet mills are very dull. There is no new buying of steel, as most consumers have large stocks that will run them over the next two or three months. Prices are largely nominal. We quote Bessemer and open-hearth billets at \$20, and Bessemer and open-hearth sheet bars at \$21, f.o.b. makers' mills, Pittsburgh or Youngstown, for May and June delivery; forging billets, \$25 on desirable specifications, embracing only one size, and up to but not including 10 x 10 in., the regular extras being charged for larger sizes. On small orders forging billets are held at \$26. We quote axle billets at \$23 for desirable orders and \$24 for small orders.

**Muck Bar.**—The market is bare of new sales, and we quote best grades of muck bar, made from all pig iron, at nominally \$27, delivered buyer's mill, Pittsburgh district. Eastern muck bar is offered in this market at a lower price.

**Ferroalloys.**—Reports that regular prices on ferrosilicon were to be reduced are denied. We note a sale of about 125 tons of 50 per cent. ferrosilicon at \$72, delivered buyer's mill, for forward delivery. We also

note a sale of two cars of English 80 per cent. ferro-manganese at \$38, seaboard, the freight from Baltimore to Pittsburgh being \$2.16 per ton. There is very little new buying of ferroalloys, as consumers are covered for some time. We quote 50 per cent. ferrosilicon, in lots up to 100 tons, at \$73; over 100 tons to 600 tons, \$72; over 600 tons, \$71, delivered in the Pittsburgh district. On 10 per cent. ferrosilicon the quotation is \$19; 11 per cent., \$20, and 12 per cent., \$21, f.o.b. cars Jackson County, Ohio, or Ashland, Ky., furnace. We quote 20 per cent. spiegeleisen at \$25 at furnace. We quote ferrotitanium at 8c. per lb. in carloads; 10c. in 2000-lb. lots and over, and 12½c. in less than 2000-lb. lots.

**Structural Material.**—The past week has been very quiet, local fabricating interests stating they have taken no large contracts. The John Eichleay, Jr., Company has booked 280 tons for new buildings for the Board of Education, Pittsburgh, and another independent interest has taken 650 tons for three steel bridges at Grand Rapids, Mich. We quote beams and channels up to 15 in. at 1.12½c. to 1.15c., f.o.b. Pittsburgh.

**Plates.**—The Delaware, Lackawanna & Western has bought 750 steel hopper coal cars, 400 from the American Car & Foundry Company and 350 from the Cambria Steel Company, and is still in the market for 200 automobile cars. The Erie has an inquiry out for 800 all-steel hoppers. The inquiry from the Illinois Central for 3000 box cars, which has been in the market for two months or more, is still pending. The Pressed Steel Car Company has placed orders with the Carnegie Steel Company for 30,000 tons or more of plates and shapes for new cars to be built for Steel Corporation railroads. The general demand for plates is dull, and some mills are running to less than 50 per cent. of capacity. We quote ¼-in. and heavier plates at 1.10c. to 1.15c., f.o.b. Pittsburgh, prices depending on the order.

**Steel Rails.**—Only small orders for standard sections are being placed, but the new demand for light rails from the coal mining interests is fairly active, the Carnegie Company having received new orders and specifications in the past week for close to 2500 tons. The lumber interests and plantation owners are not ordering light rails very freely. We quote light rails rolled from billets as follows: 25, 30, 35, 40 and 45 lb. sections, 1.10c.; 16 and 20 lb., 1.15c.; 12 and 14 lb., 1.20c., and 8 and 10 lb., 1.25c., in carload lots, f.o.b. Pittsburgh. For large lots, these prices might be slightly shaded.

**Skelp.**—The new demand continues quiet, but is expected to improve soon as the pipe mills report they are getting more orders. We quote: Grooved steel skelp, 1.20c. to 1.25c.; sheared steel skelp, 1.25c. to 1.30c.; grooved iron skelp, 1.60c. to 1.65c., and sheared iron skelp, 1.65c. to 1.70c., delivered to consumers' mills in the Pittsburgh district.

**Wire Rods.**—Contracts for last half delivery are being placed, but some consumers, whose contracts expire on June 30, have not been taking them out very freely and have enough still due to meet their needs for two or three months to come. We quote Bessemer, open-hearth and chain rods at \$24.50 to \$25, f.o.b. mill, Pittsburgh, the higher price being for small lots.

**Cotton Ties.**—It will likely be some time before the Carnegie Steel Company gives out its prices on cotton ties for this year's trade. This company is now rolling cotton ties, and later on will name its prices. The foreign makers are not naming prices, but are said to have stated they will sell cotton ties at 10c. per bundle under any prices of domestic makers.

**Iron and Steel Bars.**—This is the season when implement makers usually place their contracts for steel bars for a year ahead, but so far very little has been done. The main reason for this is that their business for some months has been very dull, and not only they, but their distributing houses, have large stocks which will take some time to work off. However, leading makers of steel bars that sell heavily to the implement trade state that negotiations are now under way. They announce that prices to the implement trade for third quarter are 1.12½c. to 1.15c. and for fourth quarter



1.15c. to 1.20c., Pittsburgh. Some makers will not sell steel bars into 1915, but are limiting deliveries to this year. The new demand for both iron and steel bars is dull and specifications are quiet. There is a good demand for steel bars for reinforcing work, and large orders are being placed. We quote steel bars at 1.12½c. to 1.15c., and common iron bars, in which very little scrap is used, at 1.25c. to 1.30c., f.o.b. makers' mill, Pittsburgh. Regular extras for twisting reinforcing steel bars over the base price are as follows: ¾-in. and over, \$1; ½ to 1 1/16-in., \$1.50; under ½-in., \$2.50 per net ton. These extras are not always observed.

**Sheets.**—The new demand for black and galvanized sheets is quiet, but some of the large consumers and also jobbers are willing to contract for last half of the year at present prices. However, the mills as a rule are refusing to sell so far ahead and will take orders only for third quarter shipment. One automobile builder is reported to have placed a contract for 8000 tons of special sheets for delivery in the third quarter. The sheet mills are running at about 50 per cent. or less of capacity. We quote Nos. 9 and 10 blue annealed sheets at 1.35c.; No. 28 Bessemer black, 1.80c. to 1.85c., No. 28 galvanized, 2.75c. to 2.80c.; No. 28 black plate, tin mill sizes, H. R. and A., 1.85c.; Nos. 29 and 30, 1.90c. The above prices are in carload lots, f.o.b. Pittsburgh, jobbers charging the usual advances for small lots from store.

**Tin Plate.**—New specifications have quieted down a good deal, but the mills are busy on specifications placed in March and April. The American Sheet & Tin Plate Company has received a third order, for about 150,000 boxes of oil sizes of bright plates, from the Standard Oil Company. On small lots we quote 100-lb. 14 x 20 coke plates at \$3.30 to \$3.40, and 100-lb. 14 x 20 terne plates, \$3.20 to \$3.30, Pittsburgh.

**Shafting.**—The new demand continues dull, not being more than 25 to 30 per cent. of capacity of the makers, and specifications are also slack. This trade is in very unsatisfactory condition, both from standpoint of prices and new demand. We quote cold-rolled shafting in carload lots at 65 to 66 per cent. off, and in exceptional cases 67 per cent. has been done. We quote small lots at 63 to 64 per cent., delivered in base territory.

**Spikes.**—New orders are light and only for small lots, and makers of spikes are not operating to more than 30 to 40 per cent. of capacity. Specifications against contracts are also dull. The Seaboard Air Line is inquiring for about 6000 kegs. We quote standard sizes of railroad spikes at \$1.40, and small railroad and boat spikes at \$1.50 per 100 lb. in carload lots, f.o.b. Pittsburgh.

**Merchant Steel.**—The new demand is a little better, one leading mill stating that its output and shipments in May were larger than in April. Stocks carried by jobbers are fairly heavy and are moving out very slowly to the consuming trade. Prices are not strong, being more or less shaded, and for small lots are about as follows: Iron finished tire, ½ x 1½ in. and larger, 1.30c., base; under ½ x 1½ in., 1.45c.; planished tire, 1.50c.; channel tire, ¾ to ¾ and 1 in., 1.80c. to 1.90c.; 1½ in. and larger, 1.90c.; toe calk, 1.90c. to 2c., base; flat sleigh shoe, 1.65c.; concave and convex, 1.70c.; cutter shoe, tapered or bent, 2.20c. to 2.30c.; spring steel, 1.90c. to 2c.; machinery steel, smooth finish, 1.70c. We quote cold-rolled strip steel as follows: Base rates for 1 in. and 1½ in. and wider, under 0.20 carbon, and No. 10 and heavier, hard temper, 3.25c.; soft, 3.50c.; coils, hard, 3.15c.; soft, 3.40c.; freight allowed. The usual differentials apply for lighter sizes.

**Steel Wheels.**—The Carnegie Steel Company is rolling 20,000 steel wheels for equipment for 2500 cars being built by the Pressed Steel Car Company for the Steel Corporation ore roads. We quote 33-in. engine truck wheels at \$21; 36-in. engine truck wheels, \$22; 33-in. tender wheels, \$17; 36-in. passenger and tender wheels, \$19 to \$19.50; 33-in. freight car wheels, \$14.50 to \$15, f.o.b. Pittsburgh.

**Wire Products.**—The wire trade is very dull and prices have sagged to the basis of \$1.50 for wire nails, and \$1.30 to \$1.35 on plain annealed wire to the large trade. The new demand for wire and wire nails has

been light for some time and specifications have been dull. Competition for the small amount of new business coming up is keen, and this explains largely the decline in prices. To the large trade we quote wire nails at \$1.50 to \$1.55; plain annealed wire, \$1.30 to \$1.35; galvanized barb wire and fence staples, \$1.90 to \$1.95; painted barb wire, \$1.50 to \$1.55, all f.o.b. Pittsburgh, actual freight added to point of delivery, terms 30 days net, less 2 per cent. off for cash in 10 days. We quote steel cut nails at \$1.55 to \$1.60, f.o.b. Pittsburgh.

**Hoops and Bands.**—The new demand continues dull and only for small lots, and specifications are quiet. No improvement in demand is looked for until August or September, at which time distillers usually place contracts for hoops for fall delivery. We quote steel bands at 1.12½c. to 1.15c., with extras as per the steel bar card, and steel hoops at 1.25c., f.o.b. Pittsburgh.

**Rivets, Nuts and Bolts.**—The trade in these products is very unsatisfactory, new demand being light and competition keen, prices being more or less shaded. Some of the makers of nuts and bolts are running to only about 25 per cent. of capacity, but others are doing a little better. The new demand for rivets is also dull and prices are weak. We quote buttonhead structural rivets in carloads at 1.55c. and in small lots 1.60c. to 1.65c.; conehead boiler rivets at 1.65c. in carload lots, and 1.70c. to 1.75c. in small lots, with terms 30 days net, less 2 per cent. for cash in 10 days. Discounts on nuts and bolts are as follows in lots of 300 lb. or over, delivered within a 20c. freight radius of maker's works:

Coach and lag screws.....	80 and 5% off
Small carriage bolts, cut threads.....	80% off
Small carriage bolts, rolled threads.....	80 and 5% off
Large carriage bolts.....	75 and 5% off
Small machine bolts, cut threads.....	80 and 5% off
Small machine bolts, rolled threads.....	80 and 10% off
Large machine bolts.....	75 and 10% off
Machine bolts, c.p.c. & t nuts, small.....	80% off
Machine bolts, c.p.c. & t nuts, large.....	75 and 5% off
Square h.p. nuts, blanked and tapped.....	\$6.30 off list
Hexagon nuts.....	\$7.20 off list
C.p.c. and r sq. nuts, blanked and tapped.....	\$6.00 off list
Hexagon nuts, ¾ and larger.....	\$7.20 off list
Hexagon nuts, smaller than ½ in.....	\$7.80 off list
C.P. plain square nuts.....	\$5.50 off list
C.P. plain hexagon nuts.....	\$5.90 off list
Semi-fin. hex nuts, ½ in. and smaller.....	85, 10 & 10% off
Semi-fin. hex. nuts, ¾ in. and larger.....	85 & 5% off
Rivets, 7/16 x 6½, smaller & shorter.....	50, 10 & 5% off
Rivets, tin plated, packages.....	80, 10 and 5% off
Rivets, metallic tinned, packages.....	80, 10 and 5% off
Standard cap screws.....	70, 10 and 10% off
Standard set-screws.....	75, 10 and 10% off

**Boiler Tubes.**—The new demand for locomotive and merchant tubes is better, but is still much short of being large enough to give the mills full work. Operations among tube mills are on about a 50 per cent. or less basis, and discounts are being shaded.

**Standard Pipe.**—For both merchant iron and steel pipe the new demand is said to be a little better. Some inquiries are out for line pipe. The Ohio Fuel Gas Company is in the market for 40 miles of 16-in. The directors of this company are meeting in this city today and may possibly order the purchase before adjourning. The Philadelphia Company is in the market for 5 miles of 10-in. line pipe. The pipe mills are running to about 50 per cent. of capacity. While discounts on merchant pipe are held, low prices are being made on line pipe, which it is claimed leave very little profit to the makers.

**Coke.**—Blast furnace operators whose contracts expire on June 30 are not showing any anxiety to contract for last half of the year. As indicating the dull condition of the coke trade it is stated that operations in the two Connellsville regions are down to a 50 per cent. basis. More ovens are being blown out nearly every day, and this week it is stated fully 800 or more will be put out. The Connellsville Courier reports the output of coke in the upper and lower Connellsville regions for the week ended May 23 as 257,630 net tons, a decrease over the previous week of over 37,000 tons and the lightest output in any one week since early January of this year. We quote standard makes of furnace coke for prompt shipment at \$1.75 to \$1.85 per net ton at oven and on contracts \$1.85 to \$2, two or three leading makers still holding for \$2, but they are not getting any business.

**McKENZIE BROTHER & SONS**  
Mechanical and Civil Engineers,  
PITTSBURGH, PA.

**Old Material.**—The June scrap list of the Pennsylvania Railroad offers about 20,000 tons of miscellaneous iron and steel scrap, bids to be in on June 3. Consumers are not buying scrap on new contracts, but several are known to be drawing on stocks and are expected to be in the market before long as buyers. Borings continue scarce, and several sales of 500 to 600 tons have been made at \$8.25 to \$8.50, delivered at consumers' mills in the Pittsburgh district. Dealers quote, per gross ton, for delivery to consumers' mills in the Pittsburgh and nearby districts that take the same rates of freight as follows:

Selected heavy steel melting scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen, Midland Pittsburgh delivery .....	\$12.00 to \$12.25
Ordinary steel melting scrap .....	11.50 to 11.75
Compressed side and end sheet scrap .....	11.25 to 11.50
No. 1 foundry cast .....	11.50 to 11.75
No. 2 foundry cast .....	10.25 to 10.50
Bundled sheet scrap, f.o.b. consumers' mills, Pittsburgh district .....	8.75 to 9.00
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa. ....	12.75 to 13.00
No. 1 railroad malleable stock .....	11.00 to 11.25
Railroad grate bars .....	10.25 to 10.50
Low phosphorus melting stock .....	14.50
Iron car axles .....	22.50 to 23.00
Steel car axles .....	15.50 to 16.00
Locomotive axles, steel .....	20.00 to 20.50
No. 1 busheling scrap .....	10.25 to 10.50
No. 2 busheling scrap .....	7.25 to 7.50
Machine shop turnings .....	7.75 to 8.00
Old carwheels .....	11.25 to 11.50
Cast-iron borings .....	8.25 to 8.50
†Sheet bar crop ends .....	12.00 to 12.25
Old iron rails .....	13.75 to 14.00
No. 1 railroad wrought scrap .....	11.50 to 11.75
Heavy steel axle turnings .....	8.50 to 8.75
Heavy breakable cast scrap .....	12.00 to 12.25

†Shipping point.

## Chicago

CHICAGO, ILL., June 2, 1914.

Western markets can scarcely escape the influence of crop reports, and at this time the prospect of a record breaking harvest is coloring the general tone of the situation. Anticipation of a business revival in the fall is becoming a factor in the present trend of affairs. This applies more to the lighter and more highly finished products, while in connection with the heavier mill products fewer tangible signs of changed conditions are in evidence. Specifications for plates, shapes, bars and sheets were fair during the week, but new orders are still very light in the aggregate. Delivered prices in the West appear to have reached a level below which they are unlikely to go. The feature of the market which has in it the greatest promise for a restoration of higher values is the firm and consistent determination of producers to avoid long contracts at present prices. The acceptance even of commitments over the third quarter is exceedingly limited, although prompt shipment orders are being eagerly sought at such prices as can be secured. Pig-iron inquiry is somewhat better, but melters are being actuated by precautionary reasons rather than by any real need for material and so are slow to close.

**Pig Iron.**—From the standpoint of producers a discouragingly large tonnage of iron will be carried over into the third quarter on first half contracts. This fact, coupled with the lean order books of the foundrymen, is sufficient explanation for the but slightly increased inquiry reported on the eve of the last half. The greater part of the inquiry that is noted emanates from those who either bought very conservatively earlier in the year or from those who feel that some protection should be had against the possible requirements of the future. It is a kind of inquiry which matures into sales very slowly. Out of a possible 20,000 tons of business in sight it is estimated that perhaps two-thirds will be realized. Southern iron offers fewer evidences of activity than Northern, although one transaction involving 1000 tons is noted. Prices show no change. The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable Bessemer and basic iron, which are f.o.b. furnace and do not include a local switching charge averaging 50c. a ton:

Lake Superior charcoal .....	\$15.75 to \$16.75
Northern coke foundry, No. 1 .....	14.75 to 15.00
Northern coke foundry, No. 2 .....	14.00 to 14.50
Northern coke foundry, No. 3 .....	13.75 to 14.00
Southern coke, No. 1 f'dry and 1 soft .....	15.35 to 15.55
Southern coke, No. 2 f'dry and 2 soft .....	14.85 to 15.25
Malleable Bessemer .....	14.00 to 14.50
Standard Bessemer .....	17.00
Basic .....	13.25 to 13.50
Low phosphorus .....	21.00 to 21.75
Jackson Co. and Ky. silvery, 6 per cent. ....	16.90 to 17.10
Jackson Co. and Ky. silvery, 8 per cent. ....	17.90 to 18.10
Jackson Co. and Ky. sil'vy, 10 per cent. ....	18.90 to 19.10

**Rails and Track Supplies.**—The purchase of a few hundred tons of girder rails is reported and also a small number of unimportant tonnages of standard section rail. Aside from this the week offered nothing of interest. We quote standard railroad spikes at 1.50c. to 1.55c., base; track bolts with square nuts, 2c. to 2.10c., base, all in carload lots, Chicago; tie plates, \$26 to \$28 net ton; standard section Bessemer rails, Chicago, 1.25c., base; open hearth, 1.34c.; light rails, 25 to 45 lb., 1.25c.; 16 to 20 lb., 1.30c.; 12 lb., 1.35c.; 8 lb., 1.40c.; angle bars, 1.50c., Chicago.

**Structural Material.**—The mills report the volume of specifications quite well maintained, although fabricators have in the past week been less important factors. Car builders placed a round tonnage last week, but car transactions are being conducted with so much secrecy that the cars for which the steel is intended are difficult of tracing. It is understood that arrangements have been made for the building of the 3000 Illinois Central freight cars, but the purchase has not been formally announced. With one exception—the order for 2450 tons for the Northern Pacific Railway placed with the American Bridge Company—contracts for fabricated steel last week were unimportant. Prices are such as to yield only the narrowest margin of profit. Other contracts include 308 tons for the Chicago, Milwaukee & St. Paul, to the Milwaukee Bridge Company; 117 tons for the Chicago, Rock Island & Pacific, to the American Bridge Company, and 218 tons for the same road to the Chicago Bridge & Iron Company; 498 tons for the Houston & Brazos Valley Railway, to the Virginia Bridge & Iron Company. We continue to quote for structural shapes, Chicago delivery, from mill, 1.28c. to 1.33c.

We quote for Chicago delivery of shapes, from store, in small lots, 1.75c.

**Plates.**—The market still lacks the placing of sufficient tonnage of plates,  $\frac{1}{4}$  in. and heavier, to afford the mills anything like a satisfactory working basis. Specifications last week from car builders carried some plate tonnage, but the run of orders being booked is of miscellaneous character. For Chicago delivery, from mill, we quote 1.25c. to 1.30c.

For Chicago delivery of plates from store in small quantities we quote 1.75c.

**Sheets.**—The low point in prices for galvanized sheets appears to have been reached in connection with the sale of a round tonnage to a manufacturer of eaves trough and conductor pipe on the basis of 2.75c., Pittsburgh. For less attractive business the prevailing quotations are on the basis of 1.80c. for black and 2.80c. for galvanized. Local mills appear to have booked sufficient business to carry them through June on a satisfactory scale of operation. We quote for Chicago delivery from mill: No. 10 blue annealed, 1.48c.; No. 28 black, 1.98c.; No. 28 galvanized, 2.93c. to 2.98c.

We quote for Chicago delivery from store as follows, minimum prices applying on bundles of 25 or more: No. 10 blue annealed, 1.95c.; No. 28 black, 2.35c. to 2.45c.; No. 28 galvanized, 3.35c. to 3.45c.

**Bars.**—The tardiness of the implement interests in considering 1914-15 steel-bar contracts is not surprising in view of the severe curtailment of operations at their own plants. Very little is being said about the placing of contracts or the price at which the implement business is likely to be closed. The mills are expecting to make another decided stand for the limitation of contracts to less than the full year period. Bar specifications last week were more liberal than the bookings in any other line due in part to the orders for reinforcing bars. For the Hammer Bros. White Lead Company at East St. Louis, about 200 tons of reinforcing steel will be required. Because of the un-



satisfactory delivery conditions the large sewer project at Indianapolis is attracting less attention from bar manufacturers than might be expected, but quotations submitted on the tonnage for 1914 delivery brought out a price of 1.30c. and for 1915, 1.35c. We quote for mill shipments as follows: Bar iron, 1.10c.; soft steel bars, 1.28c. to 1.33c.; hard steel bars, 1.25c. to 1.30c.; shafting in carloads, 65 per cent. off; less than carloads, 60 per cent. off.

We quote store prices for Chicago delivery: Soft steel bars, 1.65c.; bar iron, 1.65c.; reinforcing bars, 1.65c. base, with 5c. extra for twisting in sizes  $\frac{1}{2}$  in. and over and usual card extras for smaller sizes; shafting 60 per cent. off.

**Rivets and Bolts.**—The market for these commodities varies but slightly from week to week and is without new feature at this writing. We quote from mill as follows: Carriage bolts up to  $\frac{3}{4}$  x 6 in., rolled thread, 80-5; cut thread, 80; larger sizes, 75-5; machine bolts up to  $\frac{3}{4}$  x 4 in., rolled thread, 80-10; cut thread, 80-5; larger sizes, 75-10; coach screws, 80-15; hot pressed nuts, square head, \$6.20 off per cwt.; hexagon, \$7 off per cwt. Structural rivets,  $\frac{1}{2}$  to  $1\frac{1}{4}$  in., 1.73c. to 1.78c., base, Chicago, in carload lots; boiler rivets, 10c. additional.

We quote out of store: Structural rivets, 2.35c.; boiler rivets, 2.55c.; machine bolts up to  $\frac{3}{4}$  x 4 in., 75-10; larger sizes, 70-10-5; carriage bolts up to  $\frac{3}{4}$  x 6 in., 75-5; larger sizes, 70-10 off; hot pressed nuts, square head, \$6, and hexagon, \$6.70 off per cwt.

**Cast-Iron Pipe.**—At Cincinnati it is understood that the United States Cast Iron Pipe & Foundry Company is the low bidder for 700 tons of high-pressure pipe and the same company was also successful in securing 1000 tons at St. Louis. At Sioux City, Iowa, 200 tons of pipe was purchased last week and at Springfield, Ill., 100 tons. The letting of 1500 tons at Salt Lake City is scheduled for June 9. We quote as follows: per net ton, Chicago: Water pipe, 4 in., \$26; 6 to 12 in., \$24; 16 in. and up, \$23.50, with \$1 extra for gas pipe.

**Old Material.**—Changes in the values of old material during the week were scarcely perceptible, but the tendency where discernible at all, is in the direction of greater weakness. Those who have scrap to sell are not eager to dispose of it and, except for shipments against contracts, sales are made only where material is under necessity of being moved. For mill grades the run of prices approaches our minimum quotations. Steel scrap is more strongly held on the basis of present prices. About the only new offering of railroad scrap is a list of 5000 tons from the Chicago & Northwestern. We quote, for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Old iron rails	\$12.75 to \$13.25
Old steel rails, rerolling	11.25 to 11.75
Old steel rails, less than 3 ft.	10.50 to 11.00
Relaying rails, standard section, subject to inspection	24.00
Old carwheels	11.50 to 11.75
Heavy melting steel scrap	9.50 to 10.00
Frogs, switches and guards, cut apart	9.50 to 10.00
Shoveling steel	9.00 to 9.50
Steel axle turnings	6.75 to 7.25

Per Net Ton	
Iron angles and splice bars	\$12.00 to \$12.50
Iron arch bars and transoms	12.00 to 12.50
Steel angle bars	9.00 to 9.50
Iron car axles	16.75 to 17.25
Steel car axles	12.25 to 12.50
No. 1 railroad wrought	9.00 to 9.25
No. 2 railroad wrought	8.50 to 8.75
Cut forge	8.50 to 8.75
Steel knuckles and couplers	9.00 to 9.50
Steel springs	9.25 to 9.75
Locomotive tires, smooth	9.75 to 10.00
Machine shop turnings	5.00 to 5.50
Cast borings	4.50 to 5.00
No. 1 busheling	7.50 to 7.75
No. 2 busheling	6.00 to 6.25
No. 1 boilers, cut to sheets and rings	6.50 to 7.00
Boiler punchings	9.25 to 9.75
No. 1 cast scrap	9.75 to 10.25
Stove plate and light cast scrap	9.00 to 9.50
Grate bars	8.75 to 9.25
Railroad malleable	9.00 to 9.50
Agricultural malleable	8.00 to 8.50
Pipes and flues	6.50 to 7.00

**Wire Products.**—The demand is gradually quieting down and the mills of wire producers are operating but slowly. We quote to jobbers as follows: Plain wire, No. 9 and coarser, base, \$1.53 to \$1.58; wire nails, \$1.73 to \$1.78; painted barb wire, \$1.73 to \$1.78; galvanized, \$2.13 to \$2.18; polished staples, \$1.73 to \$1.78; galvanized, \$2.08 to \$2.13, all Chicago.

**Hoops and Bands.**—Mills are now taking some contracts for third quarter and on contract business are understood to be standing quite firmly on the basis of 1.15c., Pittsburgh, for bands and 1.25c. for hoops. Orders for immediate shipment appear to be receiving more favorable consideration. We quote for Chicago delivery of bands 1.33c. and for hoops 1.43c.

## Philadelphia

PHILADELPHIA, June 2, 1914.

Signs of improvement are seen in the orders for miscellaneous track supplies which are coming from the railroads. The buying has every appearance of being based on absolute necessity and confirms the common statement as to the barrenness of railroad supplies with which to carry on operations. Another encouraging factor is that many pig-iron contracts will expire this month and there now is evidence of increased interest on the part of consumers. Their inquiries, however, have not yet resulted in any noticeably increased number of purchases. Stocks of all descriptions are at or near the minimum. The trade very generally admits that a buying movement is nearer, but the great question is, How near? No betterment is shown in plates, shapes and sheets, though reinforcing bars are more active. Prices are unchanged as a rule, though some shading of pig iron has been done. Coke has shown a trifle more activity, while in old materials no interest is taken.

**Iron Ore.**—In the absence of any actual need for purchasing, the market continues inactive and otherwise unchanged. Meanwhile importations against contracts continue at a normal rate. In the week ended May 29 the arrivals at this port were 6250 tons from Cuba, 7433 tons from Sweden and 6775 tons from Africa.

**Pig Iron.**—There is general agreement that inquiries have been more numerous, but, while sales may have increased a little, their number is not proportionately greater. Despite the latter fact the trade is in a more cheerful mood, not only because of the greater interest displayed by consumers, but also because it is realized that third-quarter buying cannot be much longer deferred, many contracts expiring this month. Much of the inquiry has come from New Jersey and New England. Actual sales have continued to be of small lots, more or less routine, with the aggregate about equal to that of the previous week. Of the new inquiries, few exceed 500 tons, although there is one for 12,000 tons of basic from Connecticut and local makers of plumbing supplies and sewer pipe are inquiring for a round lot, some having been taken against their requirements at an exceptionally low figure, reported as less than \$14.75. Though the aggregate of iron sold is and for many weeks has been under normal, sales are rather good numerically, and in this connection it is pointed out that in referring to the current small sales a distinction must be drawn. There are some consumers whose buying is smaller because they are using less, while others are buying as much as formerly but taking it in smaller lots. Business in Virginia iron has been lighter, perhaps, than it was 10 days ago, but its prices have been less subjected to shading than some brands of Northern iron. The following range of prices represents the general market for near delivery in buyers' yards in this district:

Eastern Penna. No. 2 X foundry	\$14.75 to \$15.00
Eastern Penna. No. 2 plain	14.50 to 14.75
Virginia No. 2X foundry	15.55 to 15.75
Virginia No. 2 plain	15.30 to 15.55
Gray forge	13.75 to 14.00
Basic	14.00
Standard low phosphorus	21.00

**Ferroalloys.**—Only carload inquiries and sales are to be noted and there have been few of these. The quotation for both English and German 80 per cent. ferromanganese is unchanged at \$38, seaboard. One small sale of 50 per cent. ferrosilicon is reported at the full price, the quotations being \$71 to \$73, Pittsburgh, according to quantity.

**Billets.**—No improvement is shown in the demand



for open-hearth rolling billets, which are quoted at \$22.40, Philadelphia. Forging steel commands an advance of \$4 to \$5 a ton.

**Structural Material.**—Eastern mills are turning out a fair tonnage against agreements heretofore made, contracts not having been entered in most cases, but the current demand continues very light, jobbers among others taking fewer plain shapes than is normal. The best piece of structural work in this territory is a seven-span railroad bridge over the Schuylkill River, requiring 1500 tons, which the Pennsylvania Railroad is understood to have placed with the Phoenix Bridge Company. The bulk of such business as is current commands 1.30c., Philadelphia, though 1.25c. could be done on an order involving good tonnage.

**Bars.**—The best activity has been in reinforcing bars, quotations for which are without change at 1.25c. to 1.30c., Philadelphia. In the case of 784 tons of reinforcing bars of mixed sizes for the Panama Canal, the Concrete Steel Company was low bidder. Iron bars continue dull at the general price of 1.20c., Philadelphia. On steel bars 1.30c. is the usual quotation, with desirable business possible at 1.25c.

**Plates.**—For a fair-sized quantity, 1.25c., Philadelphia, would be readily accepted, though for miscellaneous carloads 1.30c. is the quotation, while for part carloads 1.33c. is asked. The little improvement noted a week ago has not held up and makers do not see much ahead of them at the moment.

**Sheets.**—Business has improved little or not at all, although third-quarter requirements must soon come to the front. Local mills, however, are not disposed to enter contracts at present prices. They continue to quote 1.50c., delivered, for No. 10 blue annealed sheets.

**Coke.**—One seller disposed of about 11,000 tons of prompt furnace coke for June delivery at a price which shaded \$1.90 per net ton at oven, the range being about \$1.75 to \$1.90. Contract furnace coke is quiet at \$2 at oven. Some sales of contract foundry coke have been made on a basis of \$2.75 per net ton at oven, the minimum being about \$2.65. Prompt foundry coke ranges from \$2.35 to \$2.50. It is reported that Virginia foundries have taken several lots of Turkey Knob New River foundry coke on contract at \$3.25 per net ton at oven. Freight rates to this city from the producing districts are as follows: Connellsville, \$2.05; Latrobe, \$1.85, and Mountain, \$1.65.

**Old Material.**—The market is quiet, although there is a little doing every day, with slight shading of pipe, carwheels and borings and turnings to get the business. The following quotations about represent the market for deliveries in buyers' yards in this district, covering eastern Pennsylvania and taking freight rates varying from 35c. to \$1.35 per gross ton:

No. 1 heavy melting steel	\$10.50 to \$11.00
Old steel rails, rerolling	12.00 to 12.50
Low phosphorus heavy melting steel	
scrap	14.50 to 15.00
Old steel axles	14.00 to 14.50
Old iron axles (nominal)	20.00 to 21.00
Old iron rails	15.00 to 15.50
Old carwheels	11.25 to 11.75
No. 1 railroad wrought	12.50 to 13.00
Wrought-iron pipe	9.25 to 9.75
No. 1 forge fire	8.00 to 8.50
Bundled sheets	8.00 to 8.50
No. 2 light iron	5.00 to 5.50
No. 2 busheling	8.00 to 8.50
Wrought turnings	7.50 to 8.00
Cast borings	8.00 to 8.50
No. 1 cast	12.00 to 12.50
Grate bars, railroad	8.00 to 8.50
Stove plate	8.50 to 9.00
Railroad malleable	9.00 to 9.50

Lewis F. Shoemaker & Co. have moved their general offices to Pottstown, Pa., and the Philadelphia office is now located at 2 South Fifteenth street, Philadelphia.

## Boston

BOSTON, MASS., June 2, 1914.

**Old Material.**—The general sentiment is improving, in the sense that the trade is more hopeful. Little material is coming out, producers holding their scrap for better prices, naming figures that the large dealers are not prepared to meet. The latter are not booking business of any account with the mills, and trade with the foundries in this territory is equally dull. Little

expectation exists that conditions will improve before the middle of August, but the feeling is growing that the last half of the year will be much better than the first half. The quotations given below are based on prices offered by the large dealers to the producers and to the small dealers and collectors, per gross ton, carload lots, f.o.b. Boston and other New England points which take Boston rates from eastern Pennsylvania points. In comparison with Philadelphia prices the differential for freight of \$2.30 a ton is included. Mill prices are approximately 50c. a ton more than dealers' prices:

Heavy melting steel	\$8.25 to \$8.50
Low phosphorus steel	13.75 to 14.75
Old steel axles	13.25 to 13.75
Old iron axles	21.25 to 21.75
Mixed shafting	12.00 to 12.25
No. 1 wrought and soft steel	9.00 to 9.25
Skeleton (bundled)	5.50 to 5.75
Wrought-iron pipe	7.50 to 7.75
Cotton ties (bundled)	6.00 to 6.25
No. 2 light	3.75 to 4.25
Wrought turnings	5.00 to 5.50
Cast borings	5.00 to 5.50
Machinery, cast	11.25 to 11.50
Malleable	8.00 to 8.25
Stove plate	7.75 to 8.00
Grate bars	5.25 to 5.50
Cast-iron carwheels	11.00 to 11.25

## Buffalo

BUFFALO, N. Y., June 1, 1914.

**Pig Iron.**—Inquiry keeps up in fairly good volume and sales amounting to about 12,000 tons, all grades, are reported. The disposition on the part of producers to waive silicon differentials is further accentuated this week. The very minimum for any foundry grade seems to be \$13 at furnace. We quote as follows for current and third quarter delivery f.o.b. furnace:

No. 1 foundry	\$13.50 to \$13.75
No. 2 X foundry	13.00 to 13.50
No. 2 plain	13.00 to 13.25
No. 3 foundry	13.00
Gray forge	13.00
Malleable	13.25 to 13.50
Basic	13.50 to 13.75
Charcoal, regular brands and analysis	15.75 to 16.75
Charcoal, special brands and analysis	20.50

**Finished Iron and Steel.**—Some inquiry is appearing from buyers usually found to be shrewd for quotations on bars, shapes and plates for immediate shipment and also for last half requirements. A number of agricultural implement people are seeking figures for requirements for remainder of 1914 and first half of 1915. At present specifications hold at about 50 per cent. of normal volume. One selling interest reports a considerable number of small orders for plates within the last ten days, and the demand for black and galvanized sheets is good. The prevailing price on bars and small shapes is 1.15c. Pittsburgh base. In wire and wire products there is a disposition on the part of jobbers to sacrifice stocks, but there is no indication of price making below the current price of \$1.40. In fabricated structural material little new business has developed. Figures are to be taken for a large foundry addition to the King Sewing Machine Company, Buffalo.

**Old Material.**—The market is displaying a waiting attitude, although quite a little buying is going on by dealers against improvement with the settlement of the freight rate question. The principal interest noted is in heavy melting steel. Prices for iron axles, old car wheels, railroad malleable and machinery cast scrap are slightly under last week's quotations. The prices are as follows, per gross ton f.o.b. Buffalo:

Heavy melting steel	\$10.00 to \$10.50
Low phosphorus steel	14.50 to 15.00
Boiler plate sheared	11.50 to 12.00
No. 1 railroad wrought scrap	11.00 to 11.50
No. 1 railroad and machinery cast	11.00 to 11.50
Old steel axles	12.75 to 13.25
Old iron axles	21.00 to 21.50
Old carwheels	11.00 to 11.50
Railroad malleable	10.00 to 10.50
Machine shop turnings	5.25 to 5.75
Heavy axle turnings	7.50 to 8.25
Clean cast borings	6.00 to 6.50
Old iron rails	15.00 to 15.50
Locomotive grate bars	9.50 to 10.00
Stove plate (not ton)	9.75 to 10.00
Wrought pipe	7.50 to 8.00
Bundled sheet scrap	6.25 to 6.50
No. 1 busheling scrap	8.25 to 8.75
No. 2 busheling scrap	5.75 to 6.25
Bundled tin scrap	10.50

## Cleveland

CLEVELAND, OHIO, June 2, 1914.

**Iron Ore.**—One sale is reported in the East amounting to between 50,000 and 100,000 tons. The market generally continues inactive with little prospect of buying movement for some time. Ore shipments up to June 1 fell off almost one-half from those of 1913. There are not enough cargoes for the boats and some of the lake freighters in commission have been ordered tied up until conditions improve. We quote prices as follows: Old range Bessemer, \$3.75; Mesaba Bessemer, \$3.50; old range non-Bessemer, \$3.00; Mesaba non-Bessemer, \$2.85.

**Pig Iron.**—A Cleveland interest has sold a round lot of malleable iron for delivery in the last half, but generally the market is very dull, both as regards sales and inquiries. We note the sale of 1200 tons of Southern charcoal iron in the Pittsburgh district for the last half and also 300 tons of No. 2 Southern for the last half and 200 tons for spot shipment for delivery in Cleveland, both sales being made at a basis of \$10.50. The outlook for much activity in the way of last half contracts in the present month is not very promising. Foundrymen generally seem satisfied with the prevailing prices, but as long as they have very few orders on their books, they are unwilling to contract for pig iron for future delivery. We quote, delivered Cleveland, as follows:

Bessemer .....	\$14.90
Basic .....	\$13.75 to 13.90
Northern No. 2 foundry .....	14.25
Southern No. 2 foundry .....	14.85
Gray forge .....	13.50
Jackson Co. silvery, 8 per cent. silicon .....	17.55
Standard low phosphorus, Valley furnace .....	20.25

**Coke.**—The sale of a round tonnage of by-product furnace coke is reported in Chicago district. Locally the market is extremely dull, and no last half contracts are being placed for either grade. We quote standard Connellsville furnace coke at \$1.75 to \$1.85 per net ton at oven for prompt shipment. Best makes of foundry coke are held at \$2.40 to \$2.65.

**Finished Iron and Steel.**—The improved sentiment prevailing for two or three weeks has not resulted in betterment in demand. Interest is centered in the efforts of the implement manufacturers to place contracts for steel bars, but mills are showing no disposition to name current prices for extended future delivery. The only actual quotation reported is on the basis of 1.15c. for the third quarter and 1.20c. for the fourth quarter. Outside of the implement trade there is practically no inquiry for contracts. Steel bars are being well maintained in this market at 1.15c., but it is felt that a round lot inquiry would bring out a lower price. Plates are being freely offered at 1.10c. by smaller mills. The sheet market is more irregular than for some time. One Cleveland manufacturer of automobile parts has placed a contract for 8000 tons of blue annealed sheets for the last half on the basis of about 1.25c. for No. 10, the specifications in connection with this contract being unusually desirable. An inquiry for 5000 tons of blue annealed sheets from a similar Cleveland interest is pending. Black sheets are freely offered at 1.80c. for black and 2.80c. for No. 28 galvanized for prompt delivery, but these prices do not represent the bottom of the market. Specifications are out for the Wm. Bingham Company warehouse in Cleveland that will require about 2500 tons of structural material and reinforcing bars. An inquiry is also pending for 300 tons of steel for repairing the Central viaduct. The structural situation generally continues quiet. The Cleveland Railway buildings requiring 1500 tons have not yet been placed, some changes being made in the plans. Bar iron is in light demand and the price unchanged at 1.20c. Cleveland. Warehouse prices are 1.80c. for steel bars and 1.90c. for plates and structural material.

**Bolts, Nuts and Rivets.**—The rivet market is weak and competition is keen. Quotations of 1.50c. for structural and 1.60c. for boiler rivets for round lots for early delivery are being made and it is possible that these prices can be shaded. The new demand for bolts and

nuts is light and prices are not firm. We quote discounts as follows: Common carriage bolts,  $\frac{3}{4}$  x 6 in., smaller or shorter, rolled thread, 80 and 5 per cent.; cut thread, 80 per cent.; larger or longer, 75 and 5 per cent.; machine bolts with h.p. nuts,  $\frac{3}{4}$  x 4 in., smaller or shorter, rolled thread, 80 and 10 per cent.; cut thread, 80 and 5 per cent.; larger or longer, 75 and 10 per cent.; coach and lag screws, 80 and 15 per cent.; square h.p. nuts, blank or tapped, \$6.30 off; hexagon h.p. nuts, blank or tapped, \$7.20 off; c. p. c. and t. square nuts, blank or tapped, \$6 off; hexagon,  $\frac{3}{4}$  in. and larger, \$7.20 off; 9/16 in. and smaller, \$7.80 off; semi-finished hexagon nuts,  $\frac{3}{4}$  in. and larger, 85, 10 and 5 per cent.; 9/16 in. and smaller, 85, 10, 10 and 5 per cent.

**Old Material.**—There is no local demand and little scrap is being sold for shipment to outside points. One Youngstown mill is still buying some heavy melting steel in small lots, but another has shut off on shipments until June 15. Valley quotations on heavy melting steel are unchanged at \$11.50 to \$11.75. Cleveland mills are taking scrap on contract very slowly. Prices are weak, but are unchanged, those on several grades being nominal. We quote, delivered Cleveland, as follows:

Per Gross Ton	
Old steel rails, rerolling .....	\$11.50 to \$12.00
Old iron rails .....	13.00 to 13.50
Steel car axles .....	15.00 to 15.25
Heavy melting steel .....	10.00 to 10.25
Old carwheels .....	11.25 to 11.75
Relaying rails, 50 lb. and over .....	23.00 to 25.00
Agricultural malleable .....	8.50 to 9.00
Railroad malleable .....	10.25 to 10.50
Light bundled sheet scrap .....	7.50 to 8.00

Per Net Ton	
Iron car axles .....	\$17.25 to \$18.25
Cast borings .....	5.50 to 6.00
Iron and steel turnings and drillings .....	5.25 to 5.50
Steel axle turnings .....	6.75 to 7.25
No. 1 busheling, new .....	8.50 to 8.75
No. 1 busheling, old .....	8.00 to 8.25
No. 1 railroad wrought .....	9.50 to 10.00
No. 1 cast .....	10.50 to 10.75
Stove plate .....	7.50 to 8.00

## Cincinnati

CINCINNATI, OHIO, June 3, 1914.—(By Wire.)

**Pig Iron.**—No confirmation can be obtained here as to the reported sale of 10,000 tons of basic to a nearby steel mill. It is generally believed that this purchase has been postponed. The foundry-iron market continues to drift along and the principal matter of interest now is centered on the consumption of iron. Many foundries in this territory have enough previously bought to run them through the next few months, but actual yard stocks are growing thinner and in a short time it is predicted that buyers will be urging forward shipments instead of holding them up as they are now doing. The largest inquiry is probably from an Indiana melter for approximately 1000 tons of Northern foundry iron for this year's shipment. Many requests for prices are being received on smaller tonnages, but it is believed that most of them are from consumers who are simply trying to keep in touch with the market. A sale of 1000 tons of Southern foundry iron was made by a local house for delivery in the next three months. There were also a few smaller sales made, but practically the whole tonnage goes into outside territory. Malleable has begun to take on a little more life; in addition to a general inquiry for 2000 tons that is before the trade, there are several smaller deals being figured on. Prices on Southern foundry iron are unchanged at \$10.50, Birmingham basis, for any shipment during the last half and on Northern at \$13.50, Ironton. Based on freight rates of \$3.25 from Birmingham and \$1.20 from Ironton we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 f'dry and 1 soft .....	\$14.25 to \$14.75
Southern coke, No. 2 f'dry and 2 soft .....	13.75 to 14.25
Southern coke, No. 3 foundry .....	13.25 to 13.75
Southern No. 4 foundry .....	12.75 to 13.25
Southern gray forge .....	12.25 to 12.75
Ohio silvery, 8 per cent. silicon .....	17.20 to 17.70
Southern Ohio coke, No. 1 .....	15.70 to 16.20
Southern Ohio coke, No. 2 .....	14.70 to 15.20
Southern Ohio coke, No. 3 .....	14.45 to 14.70
Southern Ohio malleable Bessemer .....	14.70 to 15.20
Basic, Northern .....	14.70 to 15.20
Lake Superior charcoal .....	15.25 to 17.25
Standard Southern carwheel .....	27.25 to 27.75

(By Mail)

**Coke.**—A slight improvement is seen in the inquiry for foundry coke. Furnace operators, who have not covered for enough coke to run through the year, are also said to be feeling around. However, there are no definite inquiries out for 48-hr. coke. The consumption of foundry coke has been at such a low rate the present year that many foundry operators have enough already contracted for to run them through the third quarter. A number of coke agencies have received instructions not to book any business for shipment extending later than January 1, 1915. Usually at this season contracts are for a 12 months' supply. We quote prompt shipment 48-hr. brands around \$1.75 per net ton at oven in all three districts, with 10c. to 15c. a ton added on last half contract business. Foundry coke is unchanged at \$2.50 to \$2.75 at oven, but it is possible to pick up a few Connellsville standard brands at \$2.40 for nearby shipment.

**Finished Material.**—Warehouse business is still slow, but mill agencies generally report a better inquiry for structural material, mostly from the outside. There is also a continued better feeling with both makers and users of black and galvanized sheets. Although new business is backward, there is an indication on the part of buyers to close at the present low prices to cover their future wants. The mills are said to be unwilling to take on any large tonnages except for nearby shipment. We continue our quotations of 2c. f. o. b. Cincinnati or Newport, Ky., on No. 28 black sheets and 2.95c. to 3c. on galvanized. Steel bars are unchanged at 1.75c. to 1.80c., and structural shapes 1.80c. to 1.85c. from store. There has been an excellent demand for tin plate and there is considerable business under negotiation with the can factories. It is rumored that prices have been stiffened slightly, although no definite advances have yet been made.

**Old Material.**—Buyers continue to take little interest in the market. The larger users of scrap are content to watch the pig-iron market, depending on this barometer of the trade to guide them in their purchases. The railroads have lately been offering a considerable lot of material, but scrap dealers are slow in taking hold. The minimum figures given below represent what buyers are willing to pay for delivery in their yards, southern Ohio and Cincinnati, and the maximum quotations are dealers' prices f.o.b. at yards:

Per Gross Ton	
Bundled sheet scrap.....	\$6.75 to \$7.25
Old iron rails.....	11.75 to 12.25
Relaying rails, 50 lb. and up.....	19.75 to 20.25
Rerolling steel rails.....	10.75 to 11.25
Melting steel rails.....	9.25 to 9.75
Old carwheels.....	10.25 to 10.75

Per Net Ton	
No. 1 railroad wrought.....	\$8.75 to \$9.25
Cast borings.....	4.50 to 5.00
Steel turnings.....	4.50 to 5.25
Railroad cast scrap.....	9.25 to 9.75
No. 1 machinery cast scrap.....	10.25 to 11.25
Burnt scrap.....	6.00 to 6.75
Old iron axles.....	16.75 to 17.25
Locomotive tires (smooth inside).....	9.75 to 10.25
Pipes and flues.....	6.25 to 6.75
Malleable and steel scrap.....	7.25 to 7.75
Railroad tank and sheet scrap.....	5.25 to 5.75

## Birmingham

BIRMINGHAM, ALA., June 1, 1914.

**Pig Iron.**—While pig-iron sales by local furnaces continued at about the same rate the past week as the one previous, when orders were larger than for any similar period in months, a résumé of the sales fails to show that any special optimism can be gathered. They were large only in comparison with the absolute stagnation of several preceding months. One furnace company sold 13,000 tons in the month, mostly in the last 10 days. Two others did probably as well, but it is doubtful if the total contracted for in May reached 50,000 tons. It is admitted now that \$10.50 is the level both for spot and third quarter. In fact, for the present it appears to be the universal price either for immediate or forward delivery, with, of course, an asking price of \$11 for the fourth quarter. None of the very large buyers, such as the pipe in-

terests, is reported as having been a recent purchaser. It is generally admitted that if an offer of, say, 25,000 to 50,000 tons was made, a bargain could probably be struck on the \$10 basis, both to get rid of the iron and in the hope that the market would at once rally on a few large deals. Inquiries are brisker and some makers do feel more optimistic, but they qualify by stating that there is still no general buying movement in sight. We quote, per gross ton, f.o.b. Birmingham district furnaces (the first figure being for spot and third quarter and the second for fourth quarter), as follows:

No. 1 foundry and soft.....	\$11.00 to \$11.50
No. 2 foundry and soft.....	10.50 to 11.00
No. 3 foundry.....	10.00 to 10.50
No. 4 foundry.....	9.75 to 10.25
Gray forge.....	9.50 to 10.00
Basic.....	10.25 to 10.75
Charcoal.....	23.50 to 24.00

**Cast-Iron Pipe.**—Enough additional orders are reported in pipe plants to maintain the present rate of manufacture, but there has been no real reaction yet. Inquiries are better and prospects may be said to have improved. We quote, per net ton, f.o.b. makers' yards, as follows: 4-in., \$20.50; 6-in. and upward, \$18.50, with \$1 added for gas pipe.

**Coal and Coke.**—The Tennessee Company is now supplying Government vessels with coal from its Pratt division mines on what are understood to be tentative contracts. The enormous increase in by-product coke in Alabama has caused a quasi overproduction. It is difficult to place orders for all coke that is offered. Some coke has been moving to sugar refineries in the far West. German coke is reported as being landed on the Pacific coast at \$10, while the freight rate on Alabama coke to the same territory is \$9 per ton. This may affect the re-opening of the Alabama coke trade which followed the reduction in the former freight rate. We quote, per net ton, f.o.b. oven, as follows: Furnace coke, \$2.70 to \$2.90; foundry, \$3 to \$3.25.

**Old Material.**—The market is featureless, transactions being on a limited scale. Nominal prices, per gross ton, f.o.b. dealers' yards, are as follows:

Old iron axles.....	\$14.50 to \$15.00
Old steel axles.....	14.50 to 15.00
Old iron rails.....	13.00 to 13.50
No. 1 railroad wrought.....	10.00 to 11.00
No. 2 railroad wrought.....	8.50 to 9.00
No. 1 country wrought.....	9.00 to 10.00
No. 2 country wrought.....	8.00 to 9.00
No. 1 machinery cast.....	9.50 to 10.00
No. 1 steel scrap.....	8.00 to 8.50
Tram carwheels.....	9.50 to 10.00
Standard carwheels.....	10.50 to 11.00
Stove plate.....	8.00 to 8.50

## St. Louis

ST. LOUIS, MO., June 1, 1914.

**Pig Iron.**—Considerable tentative inquiry is reported, indicating that consumers are beginning to feel out the market preparatory to making plans for the last half. No reports of heavy piling in the foundry yards are current, and it is accepted that most of the iron which has been delivered has been melted.

**Coke.**—There has been considerable activity in the competition for two attractive contracts closed in the past week, one for 30,000 tons of 48-hr. coke to a lead smelter, for delivery over 12 months from July 1 and one for 15,000 tons of foundry coke for delivery over the same period. The latter was a by-product sale, from Indianapolis ovens, and is reported to have been sold on a parity with Connellsville 72-hr. best selected. By-product coke is being quoted at about \$5.25 delivered St. Louis.

**Finished Iron and Steel.**—The volume of business has shown a continuance of the improvement noted a week ago, but no large orders have appeared. One sale of 750 tons of standard rails and another of 2200 tons are reported, the latter for an interurban line.

**Old Material.**—The only life is shown in the steel foundry grades. Lists from the railroads continue to have a depressing effect on the market, one from the Frisco being 1700 tons and another from the Missouri Pacific of 2200 tons. We quote dealers prices, f.o.b. St. Louis as follows:



Per Gross Ton	
Old iron rails	\$10.50 to \$11.00
Old steel rails, rerolling	10.50 to 11.00
Old steel rails, less than 3 feet	10.00 to 10.50
Relaying rails, standard section, subject to inspection	21.00 to 23.00
Old carwheels	10.50 to 11.00
No. 1 railroad heavy melting steel scrap	9.75 to 10.25
Shoveling steel	7.50 to 8.00
Frogs, switches and guards cut apart	9.50 to 10.00
Bundled sheet scrap	4.25 to 4.75

Per Net Ton	
Iron angle bars	\$9.50 to \$10.00
Steel angle bars	8.00 to 8.25
Iron car axles	16.75 to 17.25
Steel car axles	11.75 to 12.25
Wrought arch bars and transoms	10.50 to 11.00
No. 1 railroad wrought	7.50 to 7.75
No. 2 railroad wrought	7.25 to 7.50
Railroad springs	8.00 to 8.50
Steel couplers and knuckles	8.25 to 8.75
Locomotive tires, 42 in. and over, smooth	8.75 to 9.25
No. 1 dealers' forge	7.25 to 7.75
Mixed borings	3.25 to 3.75
No. 1 busheling	6.75 to 7.25
No. 1 boilers, cut to sheets and rings	5.25 to 5.75
No. 1 cast scrap	9.00 to 9.50
Stove plate and light cast scrap	7.00 to 7.50
Railroad malleable	7.00 to 7.50
Agricultural malleable	6.50 to 7.00
Pipes and flues	5.00 to 5.50
Railroad sheet and tank scrap	5.00 to 5.50
Railroad grate bars	6.50 to 7.00
Machine shop turnings	4.25 to 4.75

## San Francisco

SAN FRANCISCO, CAL., May 27, 1914.

A little more hopeful sentiment is expressed in several quarters, though current conditions are far from satisfactory. There is no serious complaint as to the total volume of business in finished materials, but buying is almost entirely in small quantities, and prices are low and somewhat irregular. The weakness of values may be attributed partly to actual or potential foreign competition, but the prevailing cause is apparently a desire for tonnage on the part of domestic mills. Buyers maintain their waiting policy as strongly as ever, refusing to accumulate anything beyond nearby requirements. A prominent factor in the situation is the general expectation of readjustment, both in freight rates and in the relative position of foreign and domestic products, on the opening of the Panama Canal; and an active buying movement is expected as soon as this readjustment is made.

**Bars.**—The demand for reinforcing steel is picking up a little, but inquiries of importance are scarce, and the total tonnage is still rather light. Foreign competition is cutting into the local trade to a considerable extent, preventing any firmness in prices, and local mills are running in a limited way. The movement of soft steel bars is principally of a small jobbing nature, and few orders are coming out for direct shipment from the mills. Owing to the uncertain outlook, no heavy tonnage is going to foreign interests, though a number of shipments are still to arrive on old contracts.

**Structural Material.**—Few inquiries of more than local interest have appeared, though the outlook for small work is slightly more encouraging. The Western Iron Works has a small contract for the Pacific Gas & Electric Company on Commercial street. The principal job being figured at present is the Merritt office building, Los Angeles, 650 tons. Figures are being taken for a small apartment house at Ellis and Hyde streets, and plans will soon be ready for another at Hyde and Sacramento streets. Plans are also under way for an eight-story class A apartment house, 130 x 234 ft., in Oakland. Plans are being drawn for two small jobs at Fresno.

**Rails.**—The principal interurban railroads are still working on plans for refinancing. While some apparent progress has been made, they are not yet in a position to make large purchases. A few small orders for standard sections have been placed, however, and the tonnage of light rails for mines, etc., is keeping up fairly well. Foreign competition is felt in the latter class of material, however, and prices are unsatisfactory. Arrangements have been made for a 10-mile extension of the Washington Electric Railway in Lewis County, Wash.

**Plates.**—New business is rather quiet, though manufacturers are taking some tonnage for work under way, and a few new inquiries are appearing for both tank and marine construction. The Mare Island Navy Yard is preparing an estimate on the cost of an oil storage plant, and the Llewellyn Iron Works, Los Angeles, has a contract for a large oil tank in British Columbia. The Key Route ferry system will take bids June 1 for two new steel steamers, the estimated cost being about \$200,000 each.

**Sheets.**—The manufacture of irrigation pipe, which took a heavy tonnage of galvanized sheets last year, is curtailed on account of the wet winter and late spring rains. Several orders for such material have lately been canceled, and manufacturers are withholding their orders for sheets. General jobbing business is reasonably active, but merchants are not buying beyond bare necessities, and there is little stability to either mill or resale prices.

**Standard Pipe.**—The last fortnight has brought no large inquiries, either for oil or waterworks supplies, and the outlook for important oil-line construction is uncertain. Distributive business is spotted and irregular, but of satisfactory volume in the aggregate. Merchants are buying in very small lots, and prices are unsatisfactory.

**Cast-Iron Pipe.**—Letting has been postponed on several of the inquiries recently mentioned, and practically nothing new has appeared in the way of municipal work.

**Pig Iron.**—Foundry business is making headway but slowly, and the current movement from local warehouses continues slack, with values irregular. Many melters, however, are making provision for fall requirements, and are placing contracts with importers. No. 1 Middlesbrough iron for current loading is quoted at \$19.50 to \$20 per gross ton on sailing vessel, San Francisco.

**Coke.**—Contracts for German Syndicate coke, to arrive, are gradually coming out on the basis of \$10 per gross ton. The larger consumers are still supplied by old contracts, but there is a steady movement from the local yards to the smaller foundries, which are buying only for immediate needs. Local dealers quote about \$13 to \$14 per net ton.

**Old Material.**—Cast-iron scrap is moving in a small way at about \$16 per net ton. Other lines find very little demand, as the largest consumers are operating on a limited scale, and continue to hold off from the market. Steel melting scrap is held at about \$5 to \$7 per gross ton, and wrought-iron scrap at \$5 to \$6 per net ton.

## New York

NEW YORK, June 3, 1914.

**Pig Iron.**—Inquiry has increased somewhat in the past week, though there has been no greater rate of activity in actual sales. It is understood that the 4000-ton inquiry in Connecticut referred to last week resulted in a sale of 3000 tons divided between No. 1 and No. 3 foundry iron, the delivered price on the latter being not far from \$15. The business is believed to have been divided between eastern New York and Pennsylvania furnaces. Buffalo iron has been offered in the East on a basis representing \$13 at furnace for No. 2 X, but no considerable sales are reported. The canal opening is delayed, but some quotations have been made in this district based on a canal freight of \$1.60 for delivery in the early part of the last quarter. Recent inquiry in Connecticut has brought out sharp competition. A user of basic iron is inquiring for 6000 to 12,000 tons for the last half. There is also the revival of inquiry for 2000 tons of foundry iron, and in another case 1000 tons of foundry iron is asked for and 200 tons of Bessemer ferrosilicon. In New Jersey inquiries include 1000 tons, 1800 tons, 600 tons and one for 1500 to 2000 tons, these coming from Newark and Jersey City. Stove, plumbing and machinery lines are all represented. A tentative inquiry in the Metropolitan district is for 5000 to 7000 tons for

shipment in the second half. We quote Northern iron for tidewater delivery as follows: No. 1 foundry, \$15 to \$15.25; No. 2 X, \$14.60 to \$15; No. 2 plain, \$14.35 to \$14.60; Southern iron, \$15 to \$15.25 for No. 1 and \$14.75 to \$15 for No. 2.

**Ferroalloys.**—Small lot sales and inquiries constitute the only business in 80 per cent. ferromanganese and 50 per cent. ferrosilicon. The quotation for the former is \$38, seaboard, the price for the English and German products being the same. Ferrosilicon quotations continue to be \$71 to \$73, Pittsburgh, according to the tonnage.

**Finished Iron and Steel.**—Large buyers are still apathetic and seem not to fear overstaying the market. Some low prices have been named by them for contract business but they find no takers. The situation is thus one of waiting. Activity in structural lines is maintained on the scale of recent weeks and the volume of business makes for cheerfulness. New projects, some even of considerable size, continue to come to light, as the subjoined enumeration will show. It appears that bar iron is again displacing steel bars, delivered prices on the average having for some time been under the generally accredited delivered steel bar prices. Steel bar makers claim that in this competition the buyer is wont to forego rigorously demanding a close compliance to physical requirements. The largest car purchase of the week was for 750 hopper cars for the Delaware, Lackawanna & Western, 400 going to the American Car & Foundry Company and 350 to the Cambria Steel Company. The Charlotte Harbor & Northern has bought 30 phosphorus cars from the Pressed Steel Car Company. New inquiries include 50 cars for the San Antonio & Aransas Pass and 15 passenger and 60 freight cars for Minneapolis Traction Company. In structural steel, the Pennsylvania Railroad is in the market for a bridge over the Schuylkill, taking 2100 tons; the New Haven station at Pawtucket, R. I., 1000 tons, is active, and the Long Island is to build a 200-ton bridge. Further pier work at East Boston, 500 tons, is included in the fresh possibilities, and among others are: 500 tons for St. Mary's Hospital, Hoboken; 500 tons for the National Casket Company; 2000 tons for the Y. M. C. A., Brooklyn. Three more buildings for Mt. Sinai Hospital, New York, are expected before long in the market; a high school in Montclair, N. J., and perhaps as much as 4000 tons for a motordrome at Sheepshead Bay, Brooklyn. The closures include: Towle building, Boston, 500 tons, Boston Bridge Works; 15 West Forty-fourth street, 450 tons, and West Thirty-eighth street, 600 tons, both to the Hedden Iron Construction Company; Day Nursery, East Eighty-fourth street, 200 tons, to Levering & Garriques Company; Borden Condensed Milk Company, Bronx, 200 tons, to the Communipaw Steel Company; Boston & Maine, 200 tons, Western Maryland, 1000 tons, and a hotel at Holyoke, Mass., 500 tons, all to the American Bridge Company, and a loft West Thirty-seventh street, 1000 tons, to the Hinkle Iron Company. A Y. M. C. A. building, East Third street, New York, 460 tons, has been closed as has also 1500 tons for car barns and shops at Easton, Pa. We quote mill shipments of steel bars at 1.15c. Pittsburgh, or 1.31c. New York; plates and structural, 1.10c. to 1.15c. Pittsburgh, or 1.26c. to 1.31c., New York, and iron bars at 1.22½c. to 1.27½c., New York. For lots from store we quote iron and steel bars at 1.80c. to 1.85c., New York, and plates and shapes, at 1.85c. to 1.90c.

**Cast-Iron Pipe.**—Milltown, N. J., will open bids on a contractor's job June 8 which will involve the purchase of about 1000 tons of 4 to 12 in. This appears to be the only public letting of consequence in sight here. A little more life is observed in private buying, but very low prices are being made on business of this character, as the foundries are hungry for work. An error was made last week in the statement that "the successful bidder on 2500 tons of 30-in. for Perth Amboy, N. J., May 20, is understood to have named about \$18 delivered." The price named by the successful bidder was \$18.74 per ton, the next low bid being \$18.80. Carload lots of 6-in. are to be had at \$20.50 to \$21 per net ton, tidewater.

**Old Material.**—Consumers are still apathetic. Practically no inquiries are being received either from steel works, rolling mills or foundries. All appear to be stocked with scrap. Quotations, which are largely nominal, are continued as follows, per gross ton, New York:

Old girder and T rails for melting....	\$8.00 to	\$8.50
Heavy melting steel scrap .....	8.00 to	8.50
Relaying rails .....	21.50 to	22.00
Rolling rails .....	10.00 to	10.50
Iron car axles .....	17.50 to	18.00
Steel car axles .....	11.75 to	12.25
No. 1 railroad wrought .....	10.00 to	10.50
Wrought-iron track scrap .....	9.00 to	9.50
No. 1 yard wrought, long.....	8.50 to	9.00
No. 1 yard wrought, short.....	8.00 to	8.50
Light iron .....	3.25 to	3.50
Cast borings .....	5.75 to	6.00
Wrought turnings .....	5.50 to	5.75
Wrought pipe .....	8.00 to	8.25
Carwheels .....	10.00 to	10.50
No. 1 heavy cast, broken up.....	10.50 to	11.00
Stove plate .....	7.50 to	8.00
Locomotive grate bars .....	6.00 to	6.25
Malleable cast .....	7.25 to	7.75

The Thomas Iron Company, Easton, Pa., has appointed Philip E. Wright sales agent for New York territory for the sale of Thomas pig iron, with office at 90 West street. Mr. Wright has been the Philadelphia sales agent of the company for seventeen years and will continue his office also at 628-29 Stephen Girard Building, Philadelphia. In the New York territory Mr. Wright succeeds Willard P. Chamberlin.

## British Steel Trade Improved

German Syndicate Efforts Cause Better Tone in British Finished Steel

(By Cable)

LONDON, ENGLAND, June 3, 1914.

The United States Steel Corporation has sold a little basic pig iron to Wales. Pig iron generally is dull and featureless. An improved tone is observed in finished steel, owing to German syndicate efforts, which have frightened buyers. German works have sold basic steel bars for last half delivery up to 88s. (\$21.41), f.o.b. Antwerp, an advance of 4s. (97c.) Semi-finished steel is a trifle harder, but further sales are reported of sheet bars at 79s. 6d. (\$19.34), c.i.f., Newport, England. The Standard Oil Company has placed a further order for 50,000 boxes of tin plates for the far East in America. Wales lost the business at 12s. 7½d. (\$3.07) basis for quarters, but London merchants booked 27,000 boxes of quarters for Japan at 13s. 2¼d. (\$3.20), tin lined and iron hooped. The furnaces in blast in Scotland, Cleveland and Cumberland are 168, against 167 last week. The stocks of pig iron in Conna's stores are 84,236 gross tons, against 88,853 tons a week ago. Receipts of tin plates at Swansea the past week were 148,000 boxes and shipments 163,000 boxes; stocks are 260,000 boxes. We quote as follows:

Tin plates, coke, 14 x 20, 112 sheets, 108 lb., f.o.b. Wales, 12s. 3d. (\$2.98) nominal, against 12s. 4½d. (\$3.01) a week ago.

The following prices are per ton of 2240 lb.:

Cleveland pig-iron warrants (Tuesday), 51s. 5d. (\$12.51), against 51s. ½d. (\$12.45) a week ago.

No. 3 Cleveland pig iron, makers' price, f.o.b. Middlesbrough, 52s. (\$12.65), against 51s. 9d. (\$12.59) a week ago.

Hematite pig iron, f.o.b. Tees, 61s. (\$14.84).

Sheet bars (Welsh), delivered at works in Swansea Valley, £4 10s. (\$21.89).

Steel bars, export, f.o.b. Clyde, £5 17s. 6d. (\$28.59), against £5 15s. (\$27.98) a week ago.

Steel joists, 15-in., export, f.o.b. Hull or Grimsby, £5 12s. 6d. (\$27.37).

Steel ship plates, Scotch, delivered local yards, £5 15s. (\$27.98).

Steel black sheets, No. 28, export, f.o.b. Liverpool, £8 15s. (\$42.58).

Steel rails, export, f.o.b. works port, £5 15s. (\$27.98).

The following prices are per export ton of 1015 kilos, equivalent to 2237.669 lb.:

German sheet bars, f.o.b. Antwerp, 78s. (\$18.98).  
 German 2-in. billets, f.o.b. Antwerp, 73s. (\$17.75).  
 German basic steel bars, f.o.b. Antwerp, £4 5s. to  
 £4 6s. (\$20.69 to \$20.92) for prompt shipment and £4 6s.  
 to £4 8s. (\$20.92 to \$21.41) for forward delivery.  
 German joists, f.o.b. Antwerp, £5 2s. to £5 5s.  
 (\$24.82 to \$25.55).

Freight rates from Antwerp to New York, Boston, Philadelphia and Baltimore, per 1000 kilos (2204 lb.), are about as follows: Billets, blooms and bars, up to 20 ft., 9s. to 10s. (\$2.19 to \$2.43). Iron and steel sheets, 11s. to 12s. 6d. (\$2.68 to \$3.04). Beams up to 30 ft., 12s. 6d. (\$3.04).

## Germany More Hopeful

### Manufacturers Getting Together—Belgian Manufacturers Also Combining

BERLIN, May 21, 1914.

The prospects for the organization of the various branches of finished products have continued for the most part to be regarded as good, but Thyssen, Gelsenkirchen, Hoersch, and Burbach have all rejected the basis mentioned last week for determining allotments in the proposed organization of the bar trade. The ground for their action is that they have recently increased their producing capacity, and the allotments fixed in the way proposed would do them injustice. It is understood that a commission has been appointed to arrange a special scheme of allotments to the four works in question. Otherwise, there is no progress to be reported in the work of completing these organizations.

The trade, however, is still building strong hopes on the prospect that the organizations will be formed, and this fact continues to influence at least bar prices. A slight advance was mentioned last week, and now come this week further advances of 2 to 3 marks (47c. to 71c.) a ton. The general price in the western district appears to be now about 96 marks (\$22.84), though there is much divergence in prices among the different manufacturers. Export prices for bars have not yet been affected by the improvement mentioned. Bars from the Lorraine-Luxemburg district continue to be offered f. o. b. Antwerp at 80s. (\$19.46), though the price of Belgian bars was raised at the end of last week, being now 81 to 82s. (\$19.70 to \$19.95). The export price of Belgian heavy plates has also been marked up to 94 to 95s. (\$22.87 to \$23.11), but no change in German plates has yet been mentioned.

Several days ago, however, the Belgian furnaces reduced No. 2 foundry iron 2 francs (38c.) to 67 to 68 francs (\$12.93 to \$13.12); whereas prices at the beginning of this month ranged between 71 (\$13.70) and 72 francs (\$13.89). Market reviews from Belgium are exceedingly pessimistic. Orders are reported as being extremely scarce, and some establishments have had to curtail production as much as 40 per cent. It is said that several rolling mills will be wholly shut down within a few days. Efforts are being made to organize the trade more effectively; negotiations are now in progress for forming a combination of the manufacturers of bars, and the prospects for positive action are described as being good.

From the Silesian district there is news this week of a slight improvement in the heavy plate trade, and the outlook for the future is also described as better. In thinner commercial grades also a somewhat better demand is mentioned, due to the fact that dealers had allowed their stocks to run down. In spite of the low prices, however, there is no disposition among buyers to place contracts for long periods.

J. H. Plummer was re-elected president of the Dominion Steel Corporation, Ltd., at its recent annual meeting, also of the subsidiary companies, the Dominion Iron & Steel Company and the Dominion Coal Company. The vice-presidents are Sir William C. Van Horne, William McMaster and Frederic Nicholls. A committee of the directors will name a general manager.

## Metal Market

NEW YORK, June 3, 1914.

### The Week's Prices

Cents per Pound for Early Delivery

	Copper, New York		Tin, New York	Lead—		Spelter—	
	Lake	Electro-lytic		New York	St. Louis	New York	St. Louis
May							
27.....	14.37½	14.12½	32.90	3.90	3.80	5.10	4.95
28.....	14.37½	14.12½	31.80	3.90	3.80	5.10	4.95
29.....	14.37½	14.12½	31.45	3.90	3.80	5.10	4.95
June							
1.....	14.37½	14.12½	31.25	3.90	3.80	5.10	4.95
2.....	14.25	14.00	30.45	3.90	3.80	5.10	4.95

Copper continues dull and is lower. Tin has fallen off sharply because of conditions here and abroad. Lead is steady at unchanged prices. Spelter is quiet, but maintains its price. Antimony is neglected.

### New York

**Copper.**—In a dull market prices were well maintained until yesterday when there were more offerings than takers at substantial concessions. The larger agencies did not participate in this pressure for business and adhered to their quotation of 14.25c. delivered, 30 days, or 14.12½c., cash, New York, but second hands freely offered the metal at 14c., cash, New York, and according to report even lower could be done. Exports have kept up fairly well, those of last month totaling 30,777 tons, although European buying has slackened considerably. Business in rolled sheet copper products continues only fair at best, some of the mills operating only five days and lightly also. Exports this month amount to 2140 tons. The London quotations to-day are £61 16s. 3d. for spot and £62 8s. 9d. for futures.

**Copper Averages.**—The Waterbury average for the month of May was 14.75c. The average New York price for Lake, based on daily quotations in *The Iron Age*, was 14.40c., and for electrolytic, 14.14c.

**Tin.**—There was comparatively little business throughout the week, the best day being yesterday when, following a drop of £5 in the price at London, there was a break here and sales were made all the way between 30.37½c. to 30.50c. At these prices about 150 tons, all in small lots, changed hands. Earlier in the week some of the holders of tin who needed money sold in 25-ton lots, about 100 tons changing hands. The London market is practically demoralized because of the lack of support, the bull element evidently being of the opinion that the time is not ripe to start an upward movement, therefore leaving the market to drift along and entirely subject to bear influences. Trading in London is therefore considerably under normal. The condition of the domestic market is indicated by the fact that sellers hurried to make their deliveries on June contracts at the earliest possible moment. Some of the tin so delivered was sold at around 40c., a fact over which consumers cannot be expected to be cheerful. The condition abroad is principally due to the unfavorable construction put on the world's statistics, the shipments from the Straits for May having been 788 tons larger than for the same month last year. For the five months of this year the increase in shipments from the Straits was 1774 tons over those of the same time in 1913. Meanwhile foreign consumption has eased up. London quotations to-day are £138 5s. for spot and £140 5s. for futures. Arrivals this month total 295 tons and there is afloat 2,098 tons. Domestic deliveries in May amounted to 3,800 tons.

**Lead.**—Lead has been dull but steady, with both the principal interest and outsiders quoting 3.90c., New York, and 3.80c., St. Louis. The 1,000 tons for June and July delivery, referred to as an inquiry last week, was sold on a basis of 3.95c., delivered in New England, it being understood that an ammunition maker was the buyer.

**Spelter.**—The market has continued dull though fairly steady at 5.10c. to 5.15c., New York, and 4.95c. to 5c., St. Louis, the lower prices being obtainable for good-sized lots. The slower activity of the brass mills has naturally affected spelter unfavorably.

**Antimony.**—All brands of this metal have been almost neglected. The prices quoted range as follows:



Hallett's, 6.87½c. to 7c., Cookson's, 7.12½c. to 7.20c., and other grades at about 5.75c. Hungarian grades are declared to be selling at less than cost.

**Old Metals.**—The market continues quiet. Dealers' selling prices are nominally as follows:

	Cents per lb.
Copper, heavy and crucible.....	13.25 to 13.50
Copper, heavy and wire.....	12.75 to 13.00
Copper, light and bottoms.....	12.00 to 12.25
Brass, heavy.....	9.00 to 9.25
Brass, light.....	7.50 to 7.75
Heavy machine composition.....	12.00 to 12.25
Clean brass turnings.....	8.75 to 9.00
Composition turnings.....	11.00 to 11.25
Lead, heavy.....	3.65
Lead, tea.....	3.40
Zinc scrap.....	4.25

### Chicago

JUNE 1.—The gossip of the market reports some large transactions in copper, but no general strength has developed in the situation. Apparently at present prices even the most conservative may buy with assurance. A continued increase in the visible supply of tin operated toward a further decline in values. Other prices are unchanged. We quote as follows: Casting copper, 14.25c.; Lake copper, 14.50c. to 14.75c. for prompt shipment; small lots ¼c. to ½c. higher; pig tin, carloads, 32c.; small lots, 34c.; lead, desilverized, 3.85c., and corroding, 4.10c., for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 5c. to 5.10c.; Cookson's antimony, 9.50c. for cask lots; other grades, 8c.; sheet zinc, \$7, f.o.b. La Salle or Peru, Ill., less 8 per cent. discount in carloads of 600-lb casks. On old metals we quote buying prices for less than carload lots as follows: Copper wire, crucible shapes, 11.50c.; copper bottoms, 10.25c.; copper clips, 10.75c.; red brass, 10.75c.; yellow brass, 7.50c.; lead pipe, 3.30c.; zinc, 3.50c.; pewter, No. 1, 23c.; tinfoil, 26c.; block tin pipe, 29c.

### St. Louis

JUNE 1.—The metal market has been rather slow and there has been a slight tendency toward an easing off in quotations, while the quantities dealt in have not been large. Lead closed at 3.80c.; spelter, 4.97½c.; tin, 31.25c. to 31.85c.; electrolytic copper, 14.60c.; Lake copper, 14.70c. to 14.75c.; Cookson's antimony, 7.60c. to 7.72½c. In the Joplin ore market there was a generally good feeling and although the basis range for zinc blende was \$37 to \$40 per ton for 60 per cent. very little was sold for less than \$39, while the top settlements were at \$43 to \$43.50. Calamine was also strong, selling at \$21 to \$23 on a basis of 40 per cent., with the choicest bringing as high as \$28. Lead ore was steady, but remained at \$46 for 80 per cent. Miscellaneous scrap metals are quoted as follows: Light brass, 6c.; heavy yellow brass, 8c.; heavy red brass and light copper, 10c.; heavy copper and copper wire, 11c.; zinc, 3c.; lead, 3.25c.; tea lead, 3c.; pewter, 23c.; tinfoil, 28c.

## Iron and Industrial Stocks

NEW YORK, June 3, 1914.

Another exceedingly dull week has passed. Security prices held at about the level of the previous week until yesterday when they gave way under a number of adverse influences. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chal., pref.. 43½-44½	Pgh. Steel, pref..... 85
Am. Can., com... 26½-28	Pressed Stl., com..... 44
Am. Can., pref... 89½-91	Pressed Stl., pref..... 102½
Am. Car & Fdy., com..... 50-51½	Republic, com... 22½-23½
Am. Car & Fdy., pref..... 117½-118	Republic, pref... 87-88
Am. Loco., com... 31½-32	Rumely Co., com. 12½-13½
Am. Loco., pref..... 98½	Rumely Co., pref. 32½-32½
Am. Steel Fdries..... 32	Sloss, com..... 28
Bald. Loco., com. 46-46½	Pipe, pref..... 37½-37½
Beth. Steel, com. 41-42½	U. S. Steel, Com..... 59½-62½-63½
Beth. Steel, pref..... 85	U. S. Steel, pref.. 109½-110
Case (J. I.)..... 87	West'ghse Elec.. 76½-78
Colorado Fuel... 27-28½	Am. Ship, com..... 35
Deere & Co., pref. 94-94½	Chic. Pneu. Tool... 53½
General Electric.. 147½-149½	Cambria Steel... 48-48½
Gt. N. Ore Cert... 31¼-33	Lake Sup. Corp..... 19
Int. Harv., com... 106½-108½	Warwick..... 11½
Int. Harv., Corp..... 106	Cruc. Steel, com... 16½-17
Int. Harv. Corp., pref.. 114½	Cruc. Steel, pref. 93-95
Int. Pump, pref..... 16	La Belle Iron, com..... 34-34½
Lackawanna Steel.... 32	

\*Ex. dividend.

## Customs Decision on Iron Castings

The United States Court of Customs Appeals has rendered an important decision with regard to the dutiable classification of certain machines used as a part of the equipment of breweries, thereby reversing the Board of General Appraisers and establishing an important precedent for the future classification of partly manufactured machines requiring additional labor or added fittings to adapt them for use.

The articles in question were imported in the form of iron castings, machined, drilled, etc., and were assessed for duty under paragraph 199 of the act of 1909 as "articles or wares not specially provided for \* \* \* composed wholly or in part of iron" and were claimed by the importer to be liable to duty under paragraph 147 of the same act as "castings of iron or cast-iron plates which have been chiseled, drilled, machined, or otherwise advanced in condition \* \* \* but not made up into articles." The uncontradicted testimony adduced by the importer showed the articles to be finished castings, molded, drilled and machined, but lacking a considerable amount of copper work and bronze fittings, cocks, etc., made in this country. They also required rubber gaskets and filter cloths, which are imported. The Board of General Appraisers affirmed the assessment, but the Court of Customs Appeals reverses the board in an opinion in part as follows:

Paragraph 147 has had consideration by this court in two cases. In *Jackson v. United States*, 2 Ct. Cust. Appls., 475, we considered an article admittedly complete in itself except that it was imported in the knock-down. Such an importation, consisting wholly of castings, was held to fall within the term "made up into articles," and all that remained to be done was to assemble it to make it complete.

In *United States v. Leigh & Butler*, 4 Ct. Cust. Appls., 304, on the other hand, we held that castings for use in machines, imported to be sold separately, were dutiable as castings, although the castings were complete in themselves and might in one sense be termed articles. This was held upon the ground that the wording of paragraph 147 required such a construction in order to give any force or effect to the clause "made up into articles." Castings as described in the paragraph clearly contemplated the advance of rough castings to a state which would dedicate them to use in connection with other castings for some practical end. Therefore, it would seem that when the limitation was made to castings not made up into articles, such limitation imported that the castings must not only be adapted for use in an article such as a machine, but that its parts when assembled would constitute an article or machine. Is the present importation such a complete article? We think not. It is not yet adapted to its final use, lacking as it does substantial parts, without which it cannot be devoted to the ultimate contemplated use. We are not dealing with a case in which the missing parts are inconsequential or insignificant, such, for instance, as screws used in assembling chairs imported in the knock-down, but the case presented is one in which various very substantial parts yet to be imported, or manufactured in this country, are to be supplied before the casting can be made up into an article adapted to use. To meet the requirement of the statute it must at least constitute substantially the article which is to be finally fitted for use.

While the case is a border line case, we think that the better view is that above expressed, and giving the importer the benefit of the doubt in construing the statute, the result above indicated is the correct one. The decision of the board will be reversed.

While the decision was made on a case originating under the old tariff, it applies to similar cases coming under the present tariff, in which paragraph 127 closely follows the phraseology of paragraph 147 of the old act above referred to. The present duty on castings "not made up into articles" is 10 per cent. ad valorem, but on "articles or wares not specially provided for" is twice as much, or 20 per cent.

A committee meeting of the Supplymen's Association of the American Boiler Manufacturers' Association, to arrange for the twenty-sixth annual meeting of the latter organization, which is scheduled to take place at the Waldorf-Astoria Hotel, New York, September 1 to 4, was held at that hotel June 2. The president of the supplymen's association is J. T. Corbett, Joseph T. Ryerson & Son, Chicago, and the secretary, F. B. Slocum, Continental Iron Works, Brooklyn.

## Judicial Decisions

ABSTRACTED BY A. L. H. STREET

**RESPONSIBILITY OF A MOVER OF MACHINERY.**—While a transfer company was moving a machine, using a traveling crane furnished by the owner of the machine, the crane fell, owing to spread of the rails on which it was operated, wrecking the machine. Held, that the company's liability to the owner for the damage depends upon whether he guaranteed the sufficiency of the crane and the track to carry the load, or induced the transfer company to suppose that the equipment was sufficient. If the use of the crane was under the exclusive control of the company, and the owner give no such guarantee or assurance, the company is liable for the loss. (Delaware Superior Court, Union Stone Company vs. Wilmington Transfer Company, 90 Atlantic Reporter 407.)

**SHIPPER PRESUMED TO KNOW INTERSTATE RATES.**—A shipper is conclusively presumed to know what interstate freight rates have been filed by a railroad company with the Interstate Commerce Commission, and cannot recover from the company for damages resulting from its misquotation of a rate. (United States District Court, Eastern District of Arkansas, J. H. Hamlen & Sons Company vs. Illinois Central Railroad Company, 212 Federal Reporter 324.)

**DAMAGES FOR REFUSING MACHINERY CONTRACTED FOR.**—When one who has contracted to buy machinery refuses to receive it, and the manufacturer sells it to a third person for less than the contract price, without notice to the buyer, the amount derived from such resale is not conclusive evidence against the buyer as to the value of the machinery, as affecting the seller's right to recover the difference between that amount and the agreed price. (California District Court of Appeal, Meyer vs. McAllister, 140 Pacific Reporter 42.)

**TERMINATION OF EMPLOYMENT CONTRACTS.**—When a traveling salesman is employed without any understanding as to how long the employment shall last, either party is at liberty to terminate the relation on reasonable notice being given to the other. (Oklahoma Supreme Court, Glockner vs. Jacobs, 140 Pacific Reporter 142.)

**CHECK AS FINAL SETTLEMENT.**—Where one is indisputably indebted to another to a certain amount, his act in sending a check for a smaller amount under a statement that it is tendered in full payment and the creditor's acceptance of the check do not release the debtor's liability for the amount actually remaining due. (Texas Court of Civil Appeals, Johnson vs. Hoover & Lyons, 165 Southwestern Reporter 909.)

**TRADE NAMES OF PATENTED ARTICLES.**—On expiration of a patent on "Jenkins valves" the patentee lost the right to exclusive use of that name, since it designates a particular class of valves which anyone may now manufacture, but a competitor in producing valves of the same kind is bound to indicate the source of manufacture so as to avoid misleading the public to believe that they are produced by the patentee or his successor. (United States District Court, Western District of Pennsylvania, Jenkins Brothers Company vs. Kelly & Jones Company, 212 Federal Reporter 328.)

**INJURY TO EMPLOYEE IN USING CRANE.**—An employer is liable for injury to an employee caused by the fall of a machine which he was assisting in moving by means of a crane, if the accident is attributable to failure to provide a suitable chain for the purpose, or failure to properly fasten it, the employee not having fastened the chain himself. (North Carolina Supreme Court, Ammons vs. Wysong & Miles Mfg. Company, 81 Southeastern Reporter 452.)

**LIABILITY FOR INJURY TO EMPLOYEE.**—A laborer engaged in assisting in loading iron on a truck is not presumed to know of proper means of doing the work, if such means are not matters of common knowledge. In a suit against an employer for injury to a worker, resulting from defective condition of an appliance, it is no defense that the appliance was constructed in all respects similar to appliances of the same kind used in other plants. (United States Circuit Court of Appeals, Eighth Circuit, American Car & Foundry Company vs. Uss, 211 Federal Reporter, 862.)

**ASSUMPTION OF RISK BY EMPLOYEES.**—A blacksmith assumes the risk of being injured through his helper striking a glancing blow with a sledge in the process of cutting bolts, that being an accident such as may occur by the act of the most skillful and prudent workman. (Mississippi Supreme Court, Ingram Day Lumber Company vs. Joh, 64 Southern Reporter 934.) And another employee who attempted to pull a raveled strip from a revolving pulley belt assumed the risk of being thereby injured, especially where he had been directed to report any defective condition to a co-employee. (Mississippi Supreme Court, J. J. Newman Lumber Company vs. Danzler, 64 Southern Reporter 931.)

**CONTRIBUTORY NEGLIGENCE OF MACHINE OPERATOR.**—An experienced operator of a machine, to whom has been entrusted the duty of installing the machine, cannot recover for injury resulting from his failure to adjust a wooden guard over cogwheels, where such a guard was provided and could easily have been placed in position, although his superintendent stated that a steel guard would be procured for him. (Pennsylvania Supreme Court, Ford vs. Hubbard & Co., 90 Atlantic Reporter 367.)

**CONCLUSIVENESS OF TERMS IN WRITTEN CONTRACT.**—Although the terms of a written contract of sale cannot be contradicted by a showing that different terms were orally agreed upon, oral testimony is proper to explain ambiguity in such a contract. (Springfield, Mo., Court of Appeals, Pittsburgh Steel Company vs. Cottengin, 165 Southwestern Reporter 391.)

**INJURY TO CRANE OPERATOR.**—Notice to a foreman in charge of a crane of a defect therein is notice to the employer, so far as concerns the latter's liability for injury to a workman, resulting from the defective condition. An operator of the crane did not assume the risk of being injured through falling on a grease spot on a girder along which he was required to walk, where the foreman had promised that the condition would be remedied within a few days. (Pennsylvania Supreme Court, Pfeifer vs. Allegheny Steel Company, 90 Atlantic Reporter 152.)

**EMPLOYEE'S UNAUTHORIZED USE OF AUTOMOBILE.**—When an employee uses his employer's automobile or motor truck for pleasure purposes, after business hours and without the employer's consent, the latter is not liable for injury caused to a third person through the employee's negligence. (Washington Supreme Court, Bursch vs. Greenough Brothers Company, 139 Pacific Reporter 870.)

**RIGHT TO RECOVER FOR EMPLOYEE'S DEATH.**—Before the next of kin of an employee can recover against his employer on account of his death, though due to negligence attributable to the employer, it must appear, not only that the decedent had contributed to their support during his lifetime, but that there was a reasonable probability that such support would have been continued had he lived. (Indiana Appellate Court, Standard Forgings Company vs. Holmstrom, 104 Northwestern Reporter 872.)

**VALIDITY OF MODIFIED TERMS OF SALE.**—When a valid agreement to sell goods at a certain price has been entered into, the buyer's promise to pay a larger price is not enforceable unless sustained by some new consideration. (New York Supreme Court, Appellate Term, Kuhmarker Mfg. Company vs. Hills, 146 New York Supplement 1013.)

**WARRANTY OF MACHINERY BY SELLER.**—A contract to install machinery in a building involves no implied warranty on the part of the seller that the building is adapted to such installation. A warranty that machinery will run at its rated capacity without vibration, etc., merely relates to the operation of the machinery itself, and not to the effect of its operation upon the building. (United States Circuit Court of Appeals, Fourth Circuit, Alderson vs. General Electric Company, 210 Federal Reporter, 775.)

**ACCEPTANCE OF OFFER BY LETTER.**—Mailing of a letter accepting an offer of sale forms a binding contract without regard to whether the letter is actually received, unless the offer requires the receipt of the acceptance. (Connecticut Supreme Court of Errors, Mercer Electric Mfg. Company vs. Connecticut Electric Mfg. Company, 89 Atlantic Reporter 909.)

# The National Foreign Trade Convention

## Discussions of the Export Problem at Washington Culminate in Planning an Aggressive Campaign for Foreign Commerce

Over 500 business men—most of them leaders in their respective industries—attended the National Foreign Trade Convention at Washington on May 27 to 28. The proceedings emphasized the conviction that the time is ripe for a thorough and aggressive campaign for trade in foreign markets. These four essentials to the development of foreign trade were strongly brought out. The aid of the Federal Government must be enlisted in the work; an American merchant marine must be established; export trade combinations must be permitted; and foreign loans should be made to aid in bringing trade to this country.

### THE CONVENTION'S PLATFORM

The convention concluded its work by formulating the following seven projects for foreign trade improvement:

1. The creation of a national foreign trade council of 30 members of the new organization, to be appointed by its president to co-ordinate the industrial, commercial, transportation and financial interests of the United States for the propagation and extension of foreign trade. In this movement the co-operation and perhaps the already established machinery of the chamber of commerce of the United States.
2. An effort to impress upon Congress the necessity of putting American industry on an equal footing with foreign competitors by permitting combinations for the development of foreign commerce as distinct from the commerce at home upon which the Sherman law and proposed supplementary legislation now place an inhibition.
3. Pledging the support of the members of the convention to measures necessary to increase the efficiency of the consular and diplomatic services.
4. Indorsement of increased appropriations for the trade promotion functions of the Department of Commerce.
5. Indorsement of the manufacturing census ordered to be taken in 1914 and urging manufacturers to co-operate.
6. Favoring the upbuilding of the American merchant marine.
7. Urging the President to negotiate reciprocity treaties for the extension of foreign trade.

### PRESIDENT FARRELL ON THE NEED OF ACTION

At the first session of the convention, President James A. Farrell of the United States Steel Corporation urged the development of export business as a stabilizer to this country's constantly recurring periods of prosperity and depression. He saw encouragement in the fact that the American manufacturer is making progress in the face of many obstacles. He emphasized the point that for the calendar year of 1913 the exports exceeded the imports by \$691,000,000 and totaled the impressive sum of \$2,484,000,000 in value. He went on to say:

If we consider that, in the production or manufacture of two and one-half billion dollars of exports annually, there is probably engaged in its production from its origin in the soil, or the farm, or the mines, and through all the subsequent processes of manufacture and preparation and finishing up to the shipment, 80 per cent. of the value of the materials, for in the final analysis the bulk of the cost of all manufactures or production is the labor, the wages which are paid in the production and distribution of the two and one-half billion dollars of exports amount to approximately two billion dollars annually, and it may, therefore, be reasonably assumed that this involves the employment of two million men in the manufacture or production of exports. There is, therefore, engaged, directly or indirectly, in the production or manufacture of material ultimately destined for the foreign trade, about one out of every 10 men in this country.

It was pointed out that the revenue from these millions of tons of export freight is of material importance to the successful operation of the railroads. In 1913 the excess of exports averaged over \$50,000,000 a month. In March, 1914, it had fallen to only \$5,000,000, and in April, 1914, imports were \$10,000,000 more than exports. This important development alone demands serious consideration.

The study of statistics shows that each year the nation demands more and more raw material from abroad. It is therefore essential to increase and stimulate our export trade, not only to enhance the national well being, but also to take care of the excessive output of our mills, which we can no longer consume at home.

### EUROPEAN METHOD OF BUILDING UP EXPORTS

Mr. Farrell referred to the activity of European countries in organizing to further export trade, as contrasted with individual effort here:

The large industries in our country have for many years been building up their trade in foreign markets in an energetic way and may be said to be the advance agents of American trade in all parts of the world. Smaller producers are reaping the advantage of this pioneer work.

The expansion of export trade on the part of European countries has largely been due to the co-operation between the various commercial organizations for the promotion of trade relations with individual countries; the development of commercial organizations in Germany has done much to mold the economic position of that country. Over 600 national commercial organizations, with 5000 auxiliary branches, indicate the scope and activity which such a multiplicity of ramifications bear to the results obtained by concentrated effort.

In the export field, three of the parent organizations, with a membership of over 30,000 firms, exert their combined influence in fostering the export trade of Germany. What is true of Germany in this respect is also true of England, France, Belgium, Austria-Hungary and other European nations.

### BANKING AND SHIPPING NOT ALL

There is a popular misconception that the paramount factors in the export trade of foreign countries are due to their financial ramifications and shipping facilities. But the striking annual increase of our country's trade with foreign nations reflects the results of adapting our products to the requirements of overseas markets, of painstaking effort and enterprise in competing with older manufacturing countries; of the knowledge our banking and manufacturing institutions are acquiring with respect to foreign opportunities; of the assistance that is being given by the Government and its consular representatives; of the increased efficiency of the productive establishments of this country, and the capacity of their officials for organization and commercial development.

The difficulties in conducting an export business are not insuperable and the American manufacturer will continue to concentrate his efforts on process, cost of production and adaptability of manufacturing to the requirements of the markets, as well as to the offering of wares of peculiarly American origin and ingenuity. By their use of special machinery, their extraordinary facility of invention, experiment and improvements, American manufacturers are participating to a large extent in the area of expansion in foreign commerce.

### SOUTH AMERICA OUR GOAL

Alba B. Johnson, the convention's permanent chairman, president of the Baldwin Locomotive Works, pointed out that the completion of the Panama Canal had focused the world's eye upon the continent of South America and its two billion



dollars of foreign trade each year. He called attention to its vast resources and regretted our neglect of them. That our share of this traffic is not larger he considered due to our ignorance of the market, its needs and a lack of understanding of the character of the Latin-American buyer. He believed that the South American's loyalty to those with whom he has had agreeable business relations showed that it will require a careful and tactful missionary effort to secure his trade; but its permanence, once it is gained, will well repay the endeavor. Among other things he said:

#### REQUIREMENTS OF SUCCESS

There are certain things essential to success in retaining the foreign markets when secured: The first is scrupulous care to conform without deviation to the conditions of the order, and equal care to maintain the standard of quality, even to the point of conservatism in introducing improvements. The second is to spare no effort to follow up the goods when they reach the consumer, in order to make sure of their suitability to the purpose intended, and of the customer's satisfaction with them. This offers the best guarantee of continued and increasing orders. Third, uniformity of prices should be maintained. Foreigners cannot understand the fluctuations of our business conditions, which cause low prices at one time and high prices at another. It is, therefore, better to adopt a uniform, stable line in prices, which may be higher than those charged at home in dull times and lower than those charged in prosperous times. For the same reason I would add that prompt deliveries of goods for foreign markets should be made, even though at the cost of much inconvenience to the manufacturer. Mention should be made also of the need for careful study of the treatment to which goods shipped abroad are subjected in transportation, to the necessity of adequate care in packing to provide therefor, and to the necessary limitations of the weights of packages. Much has been written upon this subject and it cannot be too strongly emphasized. The legal requirements of foreign custom-houses must be ascertained and strictly observed. In the case of machinery or kindred material which has been knocked down for transportation, every effort must be made to provide explicit drawings or instructions for its re-erection.

While there is no present difficulty in carrying on banking operations with South American nations, the speaker pointed out that most of the remittances are through European banks which do nothing in any way to assist in the extension of American trade. The opportunity for American banks is to furnish capable representatives to point out profitable openings for the investment of American capital. These men must maintain the trust and confidence of the American investor, so that those at home will take advantage of his discoveries. To properly serve the American exporter, the American banker must furnish merchants and manufacturers with immediate information as to the credit of South American buyers.

Edward N. Hurley, president of the Hurley Machine Company, and representing the Illinois Manufacturers' Association, delivered a notable address in which he said:

The opening of the Panama Canal opens our eyes. . . . No greater mistake is possible than to expect the canal, without effort on our part, to vastly enrich us with the trade of Latin America. The ditch is no magic cornucopia to shower wealth in our waiting lap.

The great opportunity for American sales in South America lies in demonstration, advertising and follow-up methods. The market is ripe for these methods. Our South American trade problem is seen to consist not only of winning markets, but defending them against competition that yearly grows keener. The head of a great American industry rightfully has said that steamship lines, banks, governmental policies, consular efforts and trade reports are of little avail unless our wares can be produced and sold in competition with the producers of other nations. Without such a basis, consideration of our overseas opportunities would be futile. But this basis does exist: the goods are being produced and are being sold. The proportions of this export trade are gratifying in themselves by stimulating in the suggestion of what will be possible when we muster behind our

industries every resource that legitimate co-operation and governmental assistance can provide.

In speaking of present commercial conditions in the United States with reference to foreign trade, E. C. Simmons, of the Simmons Hardware Company, paid tribute to the great improvement in our consular service the past 10 to 20 years. For the last five years, he said, it has been exceedingly helpful to the exporter. He urged the establishment of a government training school for consuls in Washington, where young men so inclined could be familiarized with the goods of the American manufacturer.

Other noteworthy addresses were made by prominent delegates and by officials of the government. Secretary of Commerce Redfield warned the convention that the export trade does not begin in conventions or offices but in the efficient manufacture of goods.

#### THE PRESIDENT FOR A MERCHANT MARINE

To the delegates who called at the White House President Wilson expressed his interest in their aims in these terms:

There is nothing in which I am more interested than the fullest development of the trade of this country and its righteous conquest of foreign markets. I think that you will realize from what Mr. Redfield has said to you that it is one of the things that we hold nearest to our heart, that the Government and you should co-operate in the most intimate manner in accomplishing our common object.

One of your members said something in my ear about the merchant marine, and I am sure that I speak the conviction of all of you when I say that one of our chief needs is to have a merchant marine, because if we have to deliver our goods in other people's delivery wagons, their goods are delivered first and our goods are delivered incidentally on their routes.

#### TO APPOINT TRADE COUNCIL OF THIRTY

As proposed in Article 1 of the series of suggestions for trade development adopted by the convention its president, Alba B. Johnson, will soon appoint a foreign trade council of thirty. Its principal function will be the development of a coherent national foreign trade policy. It will also endeavor to present a defense against the highly efficient trade extension campaign of several of the north European nations and Japan.

The steel trade was represented on the general committee which promoted the Washington convention by President Farrell of the Steel Corporation, President Clarke of the Lackawanna Steel Company and President Thomas of the United States Steel Products Company.

Steps for the establishment of standards of safety in iron, brass, bronze and aluminum foundries and for the safeguarding of machinery in Pennsylvania are being taken by a committee of men interested in such plants and officials of the State department of labor and industry. The draft will shortly be submitted to the State Industrial Board for action. The committee in charge is composed of Edgar T. Thomas, Baldwin Locomotive Works; William P. Ealls, representing casualty interests; H. A. Lomax, Mackintosh, Hemphill & Co., Pittsburgh, and R. M. Pennock, of the department. A meeting of a similar committee on boiler standards of safety is to be held this week, and on June 13 men interested in electrical machinery will meet for a similar purpose.

The Big Four Railroad has been given authority by the State Utilities Commission of Ohio to issue \$5,600,000 in equipment trust certificates and \$2,000,000 in notes to provide funds to purchase 7000 freight cars. These will include 2500 steel cars and 4500 steel underframe box cars.

# American and British Machinery Exports

Increases in Both Countries in the Past  
Two Years—Lines in Which the Movement  
Is Greatest—Imports Relatively Small

BY H. E. DREW

The progress made in this country within the last two or three decades in the manufacture and exportation of machinery is an interesting study, particularly when contrasted with the achievements of older countries, and when it is borne in mind that probably in no other industry have native originality and ingenuity had such a vast influence. Yet, if a hundred people representing the machinery trades of this country were to be asked off-hand to give the value of the American machinery exports and imports it is likely that the replies would be interesting in their diversity. It would be difficult for even such men to say what is the importance of the foreign trade in their industry, and its relation to that of other countries. As a matter of fact the value of machinery sent abroad in the calendar year 1913 amounted to \$127,980,880 and formed about 16½ per cent. of the exported manufactures ready for consumption—the group of exports in which they are included. The exports of machinery are therefore of great importance, and as the figures bring out some interesting facts when compared with those of Great Britain, which is a still larger producer, it is proposed in this article to show some of the achievements of the two countries in recent years and the directions in which the developments have taken place.

## EXPORT INCREASES IN 1912 AND 1913

The values of exports of machinery from the two countries in the last three calendar years are as follows:

	United States	United Kingdom
1911.....	\$102,788,309	\$154,803,390*
1912.....	120,403,692	165,790,075
	(increase of 17 per cent.)	(increase of 7 per cent.)
1913.....	127,980,880	185,137,910
	(increase of 6 per cent.)	(increase of 11 per cent.)

\*In the figures relating to the United Kingdom the £ sterling is taken as equivalent to \$5.

While the year 1912 showed greater prosperity for this country than for the United Kingdom, the respective increases over the previous year being 17 per cent. and 7 per cent., this condition was reversed last year, the respective increases being 6 per cent. and 11 per cent.

Last year the most important group of exports from the United States consisted of "engines," which were exported to the value of \$22,124,237, as against \$23,130,736 in 1912 and \$17,446,361 in 1911. Of last year's total \$9,867,912 worth represented internal combustion and \$6,537,525 steam engines—a significant change, the figures of 1911 showing \$3,559,696 for internal combustion and \$9,816,851 for steam engines. Next to engines in value are metal working machinery, \$15,558,212; then sewing machines, \$11,851,020; typewriters, \$11,054,397, and mining machinery, \$10,885,070. Among the markets taking these products the United Kingdom stands first, and then come Germany, France, Cuba, Canada and South American countries.

## BRITISH EXPORTS BY CLASSES

In the United Kingdom the machinery exports took, in 1912 (the detailed figures for 1913 are not

yet available), the fourth position in point of value, and were exceeded by cotton and woollen goods, iron and steel and coal. In that year the premier position among machinery was occupied by "prime movers," corresponding generally to our engines, and including rail and road locomotives and engines for agricultural, pumping and mining purposes, but excluding electrical machinery. These prime movers were exported to markets, including Brazil, the Argentine, Chile, Russia, Spain, Germany, Egypt and Japan, to the value of \$41,298,805, and of this sum rail locomotives and agricultural engines accounted for \$10,685,990.

The next group of British products in point of value was textile machinery, which was exported to the value of \$35,217,385. In view of the important position of textiles in the United Kingdom a prominent place for textile machinery is to be expected; but while the total for 1912 shows an increase of about 4 per cent. over that for 1911 the years 1910, 1909 and 1908 gave totals which were respectively 8, 17 and 25 per cent. larger. The best customers of the United Kingdom in this respect are, in order of importance, Germany, Russia, France, Brazil, Belgium and the United States. It is noteworthy that in practically every instance foreign countries are shown to afford more profitable fields for British enterprise than do the colonies.

## SEWING MACHINES A LARGE EXPORT FACTOR

The British figures include an item of \$40,588,915 worth of "unenumerated" machinery (as against our total of \$24,737,943 classified as "all other" kinds), and the remainder of the exports is composed of sewing machines and parts thereof, electrical machinery, boilers and agricultural machinery as distinguished from prime movers. The fact that the export of sewing machines forms an important branch of British industry is not well known and in Great Britain itself this branch of industry is usually regarded as belonging largely to the United States and Germany. However, the exports from Great Britain exceed those of both these countries and in 1912 reached the value of \$11,924,005 as against our \$11,100,254, and here again the greater portion of the British products or \$10,277,910 worth, was taken by foreign countries, including Russia, France, Italy, Turkey, China and Java. This portion of the British machinery industry appears to be increasing rapidly.

The British export trade in electrical apparatus amounted to \$9,846,505, which shows an increase over the previous four years and was distributed mainly among Japan, the Argentine, France, Australia, India and Canada.

## THE IMPORT MOVEMENT

A comparison of the imports of machinery into this country and the United Kingdom is given below for calendar years:

	United States	United Kingdom
1911.....	\$7,495,921	\$28,543,310
1912.....	7,610,511	34,103,415
	(1.6 per cent. increase)	(18.5 per cent. increase)
1913.....	6,025,671	36,410,230
	(26 per cent. decrease)	(6.75 per cent. increase)

Taken with the exports, the figures above show that while last year the ratio of our foreign purchases to sales was 6 to 128, that of the United Kingdom was 36 to 185; also that while our purchases abroad decreased by 26 per cent. those of the United Kingdom increased by 6.75 per cent. Our imports consist mostly of embroidery and lace-making machinery, machine tools and steam engines, and the bulk is obtained from the United Kingdom and Germany.

The class of machinery which predominated among the imports into the United Kingdom for the year 1912 is electrical apparatus which was purchased to the value of \$5,756,755, or nearly double the amount of 1910, which was only \$2,907,040. Practically the whole of this machinery is obtained from Germany and this country. The next class of importance is agricultural appliances, which were imported to the value of \$3,403,755, and of this amount \$2,523,095 worth was obtained from the United States. The imports of typewriters, complete and in parts, came next with \$2,745,330, of which we supplied \$2,614,975 worth. Again, the United Kingdom purchased machine tools to the value of \$1,413,215, and of these \$1,300,500 worth was derived from the United States. The remainder of the British machinery imports for 1912 consisted mainly of textile apparatus, of which we supplied \$600,100 worth out of \$1,413,215; of prime movers, road locomotives, agricultural engines, pumping plant and "unclassified."

### Important to Scale Manufacturers

WASHINGTON, D. C., June 3, 1914.—As the result of a conference here of officials charged with the execution of the laws relating to weights and measures of the several States, a bill has been introduced in the House of Representatives by Representative Ashbrook, of Ohio, of great interest to manufacturers in all trades and of the first importance to producers of scales, measures, instruments of precision, etc. The bill provides for the comprehensive control and supervision by the Federal Government of the manufacture of all weighing and measuring devices throughout the United States, except such as are intended solely for exportation to foreign countries. This control is to be vested in the Bureau of Standards, of the Department of Commerce, to which is delegated far-reaching authority and the co-operation of the United States district courts in the execution of the proposed law. The bill represents the consensus of the officials now engaged in the supervision of weights and measures of all the important States and has the official backing of the Bureau of Standards.

While the general object of the bill, which is the standardization of weighing and measuring devices and the prevention of fraud, is entirely laudable the radical character of the legislation and the rather summary means devised to effect the objects of the bill make it important for manufacturers to examine its provisions with great care and prepare themselves to suggest to the committees on coinage, weights and measures of the two houses such amendments or additions as may seem desirable. A brief summary of the bill is therefore here presented.

The measure directs that the Bureau of Standards "shall have authority to approve and shall approve the various types of weighing and measuring devices which may lawfully be used in trade and commerce throughout the United States." If the type of device submitted is approved, the Bureau of Standards is required to furnish a certificate to that effect to the person submitting the type, and notice is also required to be given of disapproval, when the applicant may take an appeal to the Secretary of Commerce, whose decision shall be final. It is made the duty of the Bureau of Standards to register and give a serial number to each type of weighing or measuring device approved and to publish

from time to time a list of such approved types with a brief description and the serial number of each type, copies of such lists to be furnished "to duly authorized weights and measures officials and to manufacturers of weighing and measuring devices throughout the United States."

After thus providing for the registration of approved types of weighing and measuring devices, the bill embraces the following drastic prohibition against the use or production of unapproved types:

Sec. 4. That it shall be unlawful for any person to manufacture, sell or offer for sale, convey or offer to convey to another, free of cost, ship or offer or deliver for shipment, or have in possession, for use in trade or commerce, or use in trade or commerce or in the collection of tolls or duties charged according to weight or measure, any weighing or measuring device the type of which has not been approved as required by this act; and any person who shall violate any of the provisions of this section shall be guilty of a misdemeanor, and for the first offense shall, upon conviction thereof, be fined not exceeding \$100, and for each succeeding offense and conviction thereof shall be punished by a fine not exceeding \$500, or by imprisonment not exceeding one year, or by both such fine and imprisonment, in the discretion of the court.

Another section requires that all weighing and measuring devices hereafter manufactured for use within the United States shall have stamped or otherwise marked thereon the name of the maker and the serial number of the approved type to which it belongs; and any maker who shall fail to mark the device shall be subject to a penalty of \$50 for each not so marked. Weighing or measuring devices so small as to render it impracticable to mark them are exempted from this requirement, provided a certificate to that effect is obtained from the Bureau of Standards. Any person fraudulently stamping any device, the type of which has not been approved, with a mark designed to make it appear that the device is of an approved type is rendered liable to a fine of \$500, or imprisonment for one year, or both.

For the enforcement of the provisions of the bill the district courts of the United States are given jurisdiction over all offenses that may be committed and it is made the duty of United States district attorneys, to whom satisfactory evidence may be presented by any duly authorized weights and measures official of the United States or of any State, Territory, or the District of Columbia to cause appropriate proceedings to be commenced and prosecuted in the proper court. It is provided that the proposed law shall take effect one year from its passage. The approval of a type by the bureau shall not be taken as evidence of the correctness of an individual weighing or measuring device of that type, nor prevent the prohibition of the use of any device which is found to be defective.

The projectors of this legislation call attention to the provisions of section 8, article 1, of the constitution of the United States which specifically delegates to Congress the power "to fix the standard of weights and measures." Whether this provision is sufficiently broad to constitute ample authorization for this comprehensive measure is a question which will no doubt be carefully considered by the Congressional committees having it in charge.

W. L. C.

The Colonial Works of the Osborn Mfg. Company, Milwaukee, Wis., has removed from Florida street to South Water and Ferry streets, where the whole of a four-story building (about 36,000 ft. of floor space) is occupied by the company. Being the largest manufacturer of brushes and brooms in the Northwest, the extra floor space has been much needed, both for manufacturing and storage purposes. The output includes a great many special styles and shapes for machine use, manufacturing purposes and various specialized trades. The Osborn line of foundry supplies is fully represented at the Milwaukee branch. All Osborn molding machines, however, are shipped from Cleveland, Ohio. The new location is in the immediate vicinity of all freight depots and boat docks, yet within a few blocks of the center of the city.



## TENDENCY TOWARD SILENCE

### More Thought Needed Toward Minimizing Noise in Factories

BY W. F. SCHAPHORST

It is difficult to understand why quietness of machine operation does not receive more prominent attention. Good feeling, ventilation, light, warmth and space are freely mentioned in economic discussions and usually, perhaps rightfully, given preference over noise or silence. We read time and again of the deplorable conditions existing in ill-ventilated, poorly lighted, cold and crowded factories.

The sense of sound is certainly important. The sense of taste and the sense of smell are seldom if ever annoyed in engineering manipulations, but where they do occur unnecessarily steps surely should be taken to remove them. Unnecessary noises that are offensive to the sound sense are a detriment to good economical work.

#### NOT UNCOMMON CONDITIONS IN NOISY FACTORIES

A gentleman was recently shown through a factory where, from the outside, one would judge that noise was the principal product. Inside he concluded that he judged rightly, that noise and confusion were the main products. All was chaos. The foremen scurried to and fro shouting orders into the ears of the workmen. The workmen misunderstood orders frequently and requested that the instructions be repeated. Or, catching a portion of the foreman's order and framing the remainder to what they believed the foreman meant to convey, the workmen went ahead with the work. Naturally, serious errors occurred from time to time, which the foremen admitted, but instead of placing the blame on the noise the foremen invariably blamed the men. That the men were not blameless cannot be disputed, for there are many successfully operated mills and factories that are necessarily so noisy that the loudest shout will carry scarcely an inch. Yet, inasmuch as the noise in the factory mentioned could have been largely subdued if not entirely eliminated, the noise factor must enter for its share of the blame.

To enlarge on the point, let us suppose that factory No. 1 operates noiselessly. Beside it is a duplicate factory No. 2 doing similar work but extremely noisy. No. 2 could be made as quiet as No. 1, but the owner contends that investment to attain noiselessness is pure extravagance. A workman in No. 1 is caught by a slowly revolving shaft. He cries for help. He is heard and his life is saved. At the same instant a workman in No. 2 is caught in the same manner. He cries for aid but is not heard. He is killed. The blame certainly must be partially attributed to unnecessary noise. Carelessness on the workman's part for getting caught and neglect on the owner's part to provide safety devices are also blamable.

#### EFFICIENCY WITH QUIETNESS

Not infrequently the foreman of a noisy shop beckons a man into a hall, private room, or other quiet place where both can converse more readily. During the conversation the workman's machine lies idle. Definite, distinct instruction is an essential to efficient management. It is not bad practice, then, to call a man away from his work for a few moments where noise is unavoidable. But where the noise is preventable, it should be prevented. The workman can then continue his work while conversing with the foreman, or time would not be lost in running in and out. Of course, it is not always possible to do accurate work and carry on a conversation simultaneously.

Not only is good fellowship enhanced, quantity increased, and quality improved in this manner, but the efficiency of the machine that has been quieted is generally improved. History tells us that the first steam engine was the embodiment of noise; the first gas engine was even worse; the first locomotive was by no means quiet, nor was Fulton's steamboat quiet. In every instance reduction of noise has accompanied increase in efficiency. Everybody is familiar with the present noiseless, efficient automobile as compared with the noisier, less efficient types of not many years ago. And so it goes, or should go, all along the line from the typewriter to the rock crusher and boiler shop. There are very few noisy operations that cannot be quieted and made more efficient. A new, noiseless method for riveting structural work, boiler plates, etc., has recently been called to the writer's attention, and from present indications it is much more efficient than the present noisy slap bang method. This is as it should be.

#### NOISE NOT REGARDED SERIOUSLY ENOUGH

There is a natural tendency toward quiet that too many owners of noisy machinery recognize only in extreme cases. Where the noise is so great that the owner himself is disturbed he begins to think about cutting it down if possible, and, as is characteristic of many natures, after lessening the noise, he manages to advertise his "humanitarian principles" to his employees. And again, after being compelled by state or other authorities to make certain changes in his equipment that will effectively reduce roaring, screeching or rattling, this manager makes further meat of his "generosity."

Noise is not regarded seriously enough. Simply because noise has been associated with factories in years past is no reason why we should allow it to continue. Experience, logic, and economy all tell us that noiselessness is an ideal state. We should strive to attain it.

### A New Turbine Cleaner for Boiler Tubes

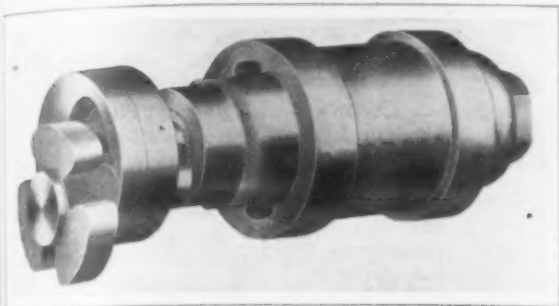
A new type of air or steam turbine driven vibrator knocker head for dislodging scale from the outer surface of the tubes in return tubular boilers has been brought out by the Lagonda Mfg. Company, Springfield, Ohio. The cleaner also removes the soot, which is loosened by the vibrating knocker and is blown out of the tube ahead of the cleaner by steam or air exhaust from the front of the turbine.

The knocker head is composed of three parts, a cylindrical tube which is somewhat smaller in diameter than the boiler tube, a knocker which is shaped like a three-leaf clover and an eccentrically pivoted lever which carries the knocker on a stud at its free end. The lever fits flush into a triangular recess in the forward face of the main body, and the free end swings in an arc through the center of the head. The three hammer faces of the knocker are shaped to fit the circumference of the boiler tube, an arrangement which, it is emphasized, gives a greater area of contact with the tube than was possible with the earlier types. This also permits the hammer to be made heavier and a firmer blow to be struck without injury to the tubes, both of which help to loosen stubborn scale.

The head is driven at a high rotative speed and the eccentrically pivoted lever carrying the knocker is thrown from side to side. The knocker is caused to revolve on its axis at each contact, thus giving a resultant gyratory motion to the knocker which causes it to hit all points of the interior circumference of the tube. The cleaner is fed into the tube

by the flexible rubber hose furnishing the air or steam pressure, the revolving motion of the head eliminating the necessity of turning the cleaner by twisting the hose.

The motor for driving the head is intended for either steam or compressed air and is of the rotary engine type. The air or steam impinges upon radial paddles, giving a high rotative speed to the shaft. The paddles themselves are continually held



A Recently Developed Type of Air or Steam Turbine Driven Cleaner for Fire Tube Boilers Having a Vibrating Head

out by the air or steam which is admitted to a chamber behind them, and it is pointed out that they always have a tight fit with the case. There are four paddles for the motor and two of these are always under pressure, which makes it impossible for the motor to stall. If desired, a special designed oiling device, which is furnished as an extra for these motors, can be supplied. This mixes the lubricating oil with the air or steam supply and thoroughly blows it into all the bearings and rubbing parts.

### Book Review

#### Engineers' Costs and Economical Workshop Production.

—By Dempster Smith, lecturer in mechanical engineering in the Manchester Municipal School of Technology, and Philip C. N. Pickworth. Pages 240, 5½ x 8½ in., with illustrations and tables. Published by Emmott & Co., Ltd., 65 King street, Manchester, England. Price 4s. 6d. Reviewed by George D. Babcock, Syracuse, N. Y.

The book includes a compressed statement of the modern methods of supervising manufacture by an industrial engineer. It is a compilation of results in a form to apply rather than abstract or even specific proofs of the sources of data upon which the results depend. References are made to the source of data and in most of the tables plotted in the form of curves, the original data have been shown in the plot, thus giving considerable confidence to the curve values that would under other circumstances not be readily accepted. The treatment covers selection of material, labor, wage systems, standardization of machines and tools, standard time for operations, accounting, selling, railway rates, shipment of goods and cost keeping.

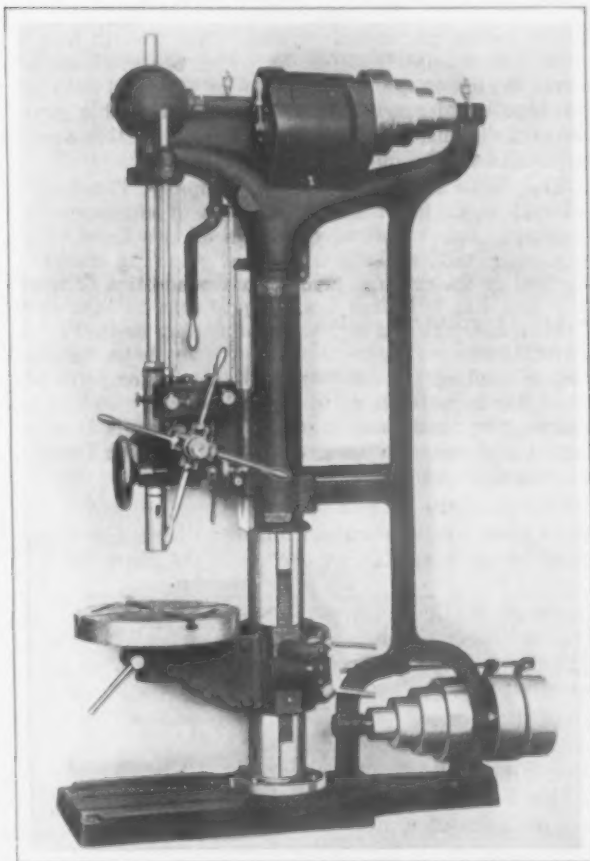
It seemed on a casual review that the wide diversity of subjects would necessitate a rambling treatment of little use, but this is not in any sense true. The statements are concise, accurate, so clearly written that within this small volume I find this to be the most useful guide and reference book that I have been able to discover up to this time on this subject under one cover. It is full of constructive ideas and altogether it is a book which I recommend to industrial managers or organizers who have had technical training either with or without the aid of a university.

The reading of this book and reference to it will naturally suggest going to sources for more detailed data in case of a thorough application of the thought being made. While it would probably be impossible for any manufacturer to secure the greatest amount of assistance from scientific management by an endeavor to use the data within this book without an organizer of some genuine repute, it would seem to be of the greatest possible help in the preliminary preparation of an industry as a foundation for such an organizer.

### High-Speed Upright Drilling Machine

The Superior Machine Tool Company, Kokomo, Ind., has brought out a 21-in. upright drilling machine in which the friction back gears and the spindle driving gears have been completely incased in fixed oil retaining housings. This method of lubricating gear trains has been applied to some classes of machine tools such as lathes, boring mills, milling machines, etc., but its use is entirely new in an upright drilling machine. In addition to improving the lubrication, such moving parts as might be likely to injure a workman are thoroughly inclosed.

The back gear case is cast integral with the yoke with the exception of the cover. The case is machined as a unit for receiving the removable bronze bushed bearings with which the machine is equipped throughout. The gear case cover is attached securely and packed so as to form an oil tight compartment and enable lubrication by the splash system to be employed. It is emphasized that one



An Upright Drilling Machine in Which the Friction Back Gears and Those Driving the Spindle Are Incased to Provide Good Lubrication

supply of lubricant will last for months and the moving parts will not be subjected to unnecessary wear. In addition to protecting the bearings and the gearing from dirt, the noise of the running gears is confined to the gear case and the throwing of oil on the operator or the floor is prevented.

The Diamond Clamp & Flask Company, Richmond, Ind., has brought out an adjustable-speed air spreader or agitator, designed to take the place of shaft-driven paddle fans that are frequently used on line shafting in hot weather for ventilating purposes. It has a friction drive controlled by a handle projecting downward from the spreader. By varying the amount of contact between the friction wheel and the disk it is possible to regulate the speed. The blades of the spreader are made of No. 20 gauge steel.

## Pittsburgh and Nearby Districts

The Pittsburgh office, located in room 2336 Oliver Building, of the American Engineering Company, Philadelphia, has taken a contract from the Pressed Steel Car Company to install 18 Taylor stokers in its McKees Rocks works. The American Sheet & Tin Plate Company will install 1400 boiler hp. equipped with Taylor stokers for burning coke braize, at its Scottdale plant. The Republic Railway & Light Company is completing the installation of three additional boilers equipped with Taylor stokers at Lowellville, Ohio. Among recent orders received for Taylor stokers is one from the Philadelphia Electric Company for equipping 20,800 hp. boilers.

The Cyclops Foundry Company, Union Bank Building, Pittsburgh, will soon complete its new foundry at Monongahela, Pa., and is taking orders for castings for delivery in the last half of the year. The plant will have modern equipment throughout.

The Pennsylvania Steel Company, Steelton, Pa., has awarded contracts for some of the equipment to be included in its extensive improvements. The Mesta Machine Company, Pittsburgh, has been given the contract for a 44-in., two-high blooming mill, including reversing tables, manipulators, etc. The mill will have a number of special features, of which the most important is the couplings, which are to be provided with the new type of Mesta universal joints. The table gears will be fully inclosed. The total weight of this equipment will exceed 2,500,000 lb.

The Jones & Laughlin Steel Company, Pittsburgh, will add eight hot mills to its present equipment at Aliquippa, Pa., which now consists of two units of 12 mills each, thus making a total of 32. The company provided in the original layout for the addition of these mills and has sufficient crane equipment to take care of them, but will add some new annealing capacity. It will build the mills complete in its own shops, but has given a contract to the Mesta Machine Company for the engine to drive them, which will be a 30 x 60 x 60 in. tandem compound Corliss. Work on the mills is to be started at once, and they are expected to be finished in about four months.

The Youngstown Iron & Steel Company, which will build a steel plant to contain four open-hearth furnaces, has selected a site of 25 acres west of the Mary furnace

This week the Bessemer and open-hearth steel plants and all the finishing mills of the Republic Iron & Steel Company, Youngstown, Ohio, are in operation except the 12 and 20 in. bar mills.

The Pipe Coiling, Bending & Welding Company, Pittsburgh, has been incorporated with a capital of \$25,000. George Best, Oakmont, is treasurer.

Service Director Heasley, Youngstown, Ohio, has announced that the city will advertise for bids for three turbines and one reciprocating pump for the new water-works pumping station.

The American Tar Products Company, Louisville, Ky., has purchased a site in Youngstown, on which it will erect a plant the coming summer.

The Thomas Carlin's Sons Company, Pittsburgh, has recently received orders for the following: Two 8-ft. standard wet grinding pans and one 20 x 12 Blake type crusher from the Bethlehem Steel Company; one No. 38 belt-driven shear from Carlson & Barger, Northampton, Mass.; one No. 18 belt-driven shear from the H. Soffranscy Company, Allentown, Pa. The following shipments have just been made: one 9-ft. grinding and mixing pan to the Electro Metals, Limited, Welland, Canada; one No. 18 shear to B. A. Zacks & Sons, Erie, Pa.; one 5-ft. wet grinding pan to the Electric Steel & Metals Company, Welland, Canada; one 6-ft. grinding pan to the H. Koppers Company; one No. 18 shear to the B. Klauber's Sons Junk Company, St. Louis, Mo.

## Special Pig-Iron Statistics for 1913

The special statistical bulletin No. 4 of the Bureau of Statistics of the American Iron and Steel Institute gives the following statistics of pig iron produced for sale by grades:

Of the total production of pig iron in 1913, 21,442,267 tons were made for the consumption of the makers and 9,523,885 tons were made for sale; total, 30,966,152 tons. These figures are revised and differ from those which appeared in special statistical bulletin No. 1.

In the following table will be found the production by grades of pig iron made for sale in 1913. Similar information was not collected by us prior to that year. Pig iron made for the consumption of the makers is not included.

States—Gross tons	Bess. and low-phos.	Basic	Forge	Foundry and ferrosilicon	Malleable	Spiegel, ferro, etc.	Total
Mass. and Conn.				12,082			12,082
New York & N. J.	68,113	232,668	18,308	748,081	239,449	8,814	1,315,433
Pennsylvania	663,399	552,999	132,538	1,026,848	100,797	33,516	2,330,097
Va., W. Va., & Ala.		155,662	63,960	1,421,104		18,998	1,659,724
Ky., Miss., & Tenn.	38,689		2,469	289,664		4,502	335,264
Ohio	363,048	809,488	21,086	785,772	311,869	12,542	2,303,505
Indiana & Illinois	69,377	120,920		167,001	210,967		568,265
Mich., Wis., Minn., Mo., Col., & Cal.	1,054	37,542		634,400	126,159		799,155
Total	1,203,680	1,909,279	238,361	5,084,952	989,241	98,372	9,523,885

of the Ohio Iron & Steel Company at Lowellville, Ohio. It is expected that work on the new mills will shortly be started.

The Baggs Mfg. Company, Huntington, W. Va., recently incorporated with a capital of \$200,000 to build mine cars, will erect a foundry and machine shop. Andrew J. Baggs, Barnesville, Ohio, is president; Ernest Chilson, Raleigh, W. Va., vice-president; F. M. Baggs, Portsmouth, Ohio, secretary and treasurer; W. H. Bines, Barnesville, Ohio, general manager, and H. E. Sharp, Bridgeport, Ohio, general sales manager.

Trunk lines having terminals in Pittsburgh sent out notices June 1 that they will file tariffs for wasting or disposing of slag or blast-furnace cinders on or before June 15. These new tariffs become effective July 15. It is stated that the proposed tariff will name 20c. per ton for wasting slag and clean ashes and 35c. for excavation material, old bricks, etc.

Members of the Engineers' Society of Western Pennsylvania will visit the Huron and Crows' Nest coal mines of the Keystone Coal & Coke Company near Greensburg, Pa., on Saturday, June 6. A special train will leave the Pennsylvania Station in Pittsburgh at 8.20 a. m.

The following table gives the production by States in 1913 of basic pig iron which was sand cast, machine cast, etc., or was delivered in molten condition to mixers, etc.:

States—Basic pig iron.	Sand cast, machine cast, chill cast, etc.	Molten condition	Total
Gross tons			
New York and New Jersey	119,305	445,047	564,352
Pennsylvania	1,814,341	5,120,654	6,934,995
Virginia and Alabama	236,896	594,292	831,188
Ohio	994,015	781,210	1,775,225
Ind., Ill., Mich., Mo., & Colo.	456,957	1,973,976	2,430,933
Total (Revised)	3,621,514	8,915,179	12,536,693

The following table gives the production by States in 1913 of Bessemer and low-phosphorous pig iron which was sand cast, machine cast, etc., or was delivered in molten condition to mixers, etc. The output of Bessemer pig iron alone in 1913 was 11,273,295 tons; of low-phosphorous alone, 316,818 tons.

States—Bessemer and low-phos. pig iron	Sand cast, machine cast, chill cast, etc.	Molten condition	Total
Gross tons			
New York and Maryland	279,769	575,956	855,719
Pennsylvania	1,605,502	2,873,335	4,478,837
W. Va., Kentucky, and Tenn.	183,545	110,300	293,845
Ohio	1,399,107	2,784,995	4,184,102
Ill., Wis., Colo., and Calif.	298,873	1,478,737	1,777,610
Total (Revised)	3,766,796	7,823,317	11,590,113



## PERSONAL

James R. Mills, for several years manager of sales at New Orleans for the Carnegie Steel Company, has been appointed to a similar position at Cleveland to succeed John R. Scott, who died recently. Stillman W. Wheelock, who has been assistant to W. B. Weston, manager of sales in the St. Louis office of the company,



JAMES R. MILLS

has been transferred to the New Orleans office as manager of sales. Mr. Mills's connection with the Carnegie Steel Company began about 15 years ago, when he was attached to the Cleveland office. Previous to going to New Orleans he was assistant manager of sales in the St. Louis office. At New Orleans he also represented the American Sheet & Tin Plate Company.

Wm. C. Post, metallurgical engineer at South Works, Illinois Steel Company, has resigned to become associated in a similar capacity with the Jeffrey Mfg. Company, Columbus, Ohio. He leaves the Illinois Steel Company after a service of 24 years. He was assistant to Albert Sauveur, the first metallurgical engineer at South Works, at the time the laboratory was installed during the incumbency of W. R. Walker as general superintendent.

J. W. Jeffrey, of the Jeffrey Mfg. Company, Columbus, Ohio, at a recent meeting of the board of directors of that company, was elected second vice-president.

A. M. Clark, Columbia Steel Company, chairman; A. G. Labbe, Willamette Iron & Steel Works, vice-chairman, and J. Helser, Helser & Under, treasurer, are the officers elected at a recent meeting of the Oregon District of the United Metal Trades Association of the Pacific Coast. All are of Portland, Ore.

J. T. Raynes, of Dunford & Ellicott (Sheffield), Ltd., Sheffield, England, is now in the United States in the interest of his company's trade in hollow steel. A. P. Pehrson, director of the company, will come to the United States within the next few weeks.

O. J. Fish, secretary of the American Shipbuilding Company, Cleveland, Ohio, has also been made treasurer of that company, succeeding in the latter office Russell C. Wetmore, who died a few months ago.

The Watson-Stillman Company, Aldene, N. J., and 50 Church street, New York City, has paid fitting recognition to the 50 years of service in its employ of

Richard Ward Baker, by presenting to him a substantial check and extending to him a month's vacation. Mr. Baker began his apprenticeship in a small factory in Grand street, June 2, 1864, and has ever since been continuously identified with Watson-Stillman Company and its predecessor. A special resolution was passed by the board of directors of the company expressing its high esteem of his long and loyal service, and the resolution was presented to Mr. Baker in the presence of the employees, officers and directors of the company at its Aldene plant.

Alfred H. Cordery, general manager of sales of the Phoenix Iron Company, Phoenixville, Pa., was presented with a loving cup by the sales department on May 29, following their annual meeting at the Philadelphia office. The company's sales representatives from all the offices attended the conference. In the presentation speech W. H. Allen, Jr., manager of the Boston office, told Mr. Cordery, who has been with the company 45 years, that the cup was presented as a token of the high regard in which he is held by all of the salesmen.

Charles F. Rand, president Spanish-American Iron Company and past president of the American Institute of Mining Engineers, has been made a member of the Order of Isabella Catolica and decorated by the King of Spain with the Grand Cross of a Knight Commander.

The board of governors of the Machinery Club of the city of New York at its annual meeting June 2, re-elected the following officers: W. L. Saunders, president; Charles A. Schieren, Jr., vice-president; Edwin H. Benners, treasurer, and Frederic Stadelman, secretary.

A. D. Pander, president Ellwood City Iron & Wire Company, Ellwood City, Pa., has sold his stock in the company to S. D. Johnson, treasurer, and D. A. Brown. Mr. Pander will remove to Texas to look after his interests in that State.

A. B. Hawes, formerly resident sales agent at Chicago, for Matthew Addy & Co., has resigned to accept a position as sales representative with Pickands, Brown & Co.

Carl A. Meissner, chairman of the coke and blast furnace committees of the United States Steel Corporation, received the honorary degree of master of science in connection with the celebration of the fiftieth anniversary of the School of Mines, Columbia University, May 29. The degree was conferred in recognition of his services in the manufacture of iron and steel.

On the same occasion Gano Dunn, president J. G. White Engineering Corporation, received the honorary degree of master of science in recognition of accomplishments and distinction in science and electrical engineering. Mr. Dunn is president of the United Engineering Society and has been president of the American Institute of Electrical Engineers and the New York Electrical Society.

## OBITUARY

HENRY LECHTENBERG, president and manager of the Central Iron Works, Quincy, Ill., died in his home city May 25 following a lingering illness, aged 62 years. He was born in Cleveland, Ohio, and went to Quincy at the age of 12. In 1883 he started a machine shop of his own and in 1889 organized the Central Iron Works. He was held in high esteem in the community.

WAKELY T. BULL, brother of the late Stephen Bull and Charles Bull, and intimately associated with the development of the J. I. Case Threshing Machine Company and the J. I. Case Plow Works, died June 1 after a brief illness at the residence of his daughter in Racine, Wis., aged 80 years.

WILLIAM R. BELKNAP, chairman of the board of directors of the Belknap Hardware & Mfg. Company, Louisville, Ky., died June 2. He was president until about three years ago, when he virtually retired from active business.

# The Bookkeeping of Manufacturing Costs

## Elements of the Cost of Material—Shop Accounts to Determine Sources of Profits and True Value of Assets, Etc.

BY FORREST E. CARDULLO

The cost of material, like the cost of capital or labor, may be divided into a number of elements. They are: 1, prime cost; 2, cost of purchase; 3, cost of transportation; 4, cost of storage. Each of these, in turn, may consist of several parts. The first of these, the prime cost, is the list price less the discount and may be further diminished in some cases by the payment of a rebate.

The second element, the cost of purchase, may be divided into three parts. They are: 1, the expense of the purchasing agent's office; 2, the cost of inspection; 3, the cost of testing. Even though there is no regular purchasing agent, somebody must devote valuable time to the purchase of materials, letters must be written and bids secured and a comfortable sum of money will often be spent in this way. The cost of all this work must be apportioned among the materials purchased in accordance with some system and becomes a part of the cost of the materials. After they are purchased they must often be examined to see that they are of the quality and quantity ordered. In addition some materials must receive chemical and physical tests in order to insure their satisfactoriness. All of these items taken together constitute the cost of purchase.

The third element, transportation, includes the items of freight or express, cartage, cost of loading or unloading boats and cars, switching charges, demurrage, and any other expense incurred in transporting a material from the point where it is produced or stored by the seller to the place where it is to be stored or used by the purchaser. This may include sometimes the items of insurance, of temporary storage, etc.

The fourth element, the cost of storage, includes the items of rent of ground and buildings occupied by the stored material, interest, insurance and taxes on the value of the material during the period of storage, leakage, the cost of store-keeping and the cost of delivery. Leakage includes all loss on account of leakage, evaporation, chemical change, decay or spoiling of materials, theft of the materials, or loss of the materials from any other cause. The cost of store-keeping is made up of the wages of the storekeeper or stock clerk, the wages of his helpers and the other expenses of administering his office. These expenses are properly divided among all the materials used during the time for which they are incurred. The cost of delivery from

the stock room to the place where the materials are used is usually small and may often be neglected.

### CLASSIFICATION OF COSTS

The accompanying table will serve to show the method of classification of the cost of a manufacturing business.

It is of no use to construct a logical and systematic classification of costs. This classification does not enable us to determine the things which we wish to know. Our cost system ought to show us a good many things. Among the more important are the unit costs of given materials, and of all given kinds of product, the cost of given operations, the cost of

operating any piece of equipment, the actual value of the equipment, the profits realized on given classes of product, the sources of the profits of the company and the true value of the assets and liabilities of the company. Last, but not least, the cost system ought to show whether the profits of the company come from interest on invested capital, or from intelligent and energetic management.

### METHOD OF ASSESSING VARIOUS CHARGES

It is impossible in any thing short of a large volume to indicate the details of the methods by which these various things may be determined. We can only give a few examples which will assist us to understand the matter. The work will be simplified if we realize that two problems are presented. The first problem is to determine the method of assessing a given charge against

the final product. The second one is to determine the cost of a given operation or piece of material.

As an illustration of the first problem we may take the freight bill for a given shipment of pig iron. Obviously this item is classified as cost of transportation of materials and is properly chargeable as one of the items in the total cost of that particular lot of pig iron when delivered at the storage yard. The cost of this material, including the charge for transportation is, of course, a part of the cost of the castings made from it. The cost of the castings in turn are a part of the cost of the finished product. In this way the cost of transportation of the pig iron finally appears as an item in the cost of manufacture of every piece made from this pig iron.

A practicable method of distributing this charge would be to open an account with pig iron. On the debit side of this account the item of freight would

- I—Fixed Charges on Investment
  - A. Interest
  - B. Depreciation
  - C. Amortization
  - D. Repairs
  - E. Insurance
  - F. Taxes
- II—Labor
  - A. Wages
  - B. Premiums or bonuses
  - C. Supervision
  - D. Cost of wage payment
  - E. Cost of hiring labor
  - F. Cost of training labor
  - G. Cost of comforts
  - H. Cost of injuries
  - I. Gifts.
- III—Materials
  - A—Prime Costs
  - B—Cost of purchase
    - 1. Purchasing agent's office expense
    - 2. Inspection
    - 3. Testing
  - C—Cost of Transportation
    - 1. Freight or express
    - 2. Cartage
    - 3. Loading or unloading
    - 4. Switching charges
    - 5. Demurrage
    - 6. Insurance
  - D—Storage
    - 1. Rent of storage space
    - 2. Fixed charges during storage
    - 3. Leakage
    - 4. Cost of store-keeping

\*Fifth and concluding article on costs of manufacturing.

appear, together with all other items properly chargeable as part of the cost of pig iron. This same item would appear on the credit side of the cash account. From the sum of the items appearing on the debit side of the pig iron account in a given period of time, the total cost of a given amount of this material, and hence the cost per pound, can be determined. When a certain amount of pig iron is used in making castings for a certain shop order, the pig iron account is credited with the value of the iron used in making these castings and the shop order is debited with the same amount. The proper proportion of the freight charge is thus assessed against each particular order, although no bookkeeping is done that is not absolutely necessary in order to determine the cost of the materials used in the given order.

#### DISTRIBUTING, FOR EXAMPLE, A TAX LEVY

As a second illustration we may take the taxes levied on the land upon which the factory stands. These taxes form a part of all of the fixed charges upon the land. These charges are divided among the different buildings or departments, in proportion to the area of land which these buildings or departments and their activities occupy. Thus these become a part of the rent of the several buildings. The rent of each building in turn is distributed among the different tools, storage spaces, work benches, etc., in proportion to the floor space which they and their activities occupy in the building. In this manner the taxes, together with many other items become a part of the tool rent. The tool rent is charged against every job done with the tool so that finally this item also is charged against the final production.

It will be noted that such an item as this is charged against the final product in many ways. It is charged as a part of the cost of material on account of the storage space which pig iron occupies in the storage yard. It is charged as a part of the cost of material on account of the storage space which the bolts and nuts and bar steel occupy in the store house. It is charged as a part of the tool rent. It is charged as a part of the cost of comforts of the space which toilets, lockers, etc., occupy. Thus we see that this item will eventually find its way into the cost of the finished product by many and diverse methods, but this does not mean that the methods employed by the bookkeeping department are unduly laborious or complicated.

One way in which the matter can be handled is to open an account with "Grounds." This account will be debited with the taxes; the interest on the value of the grounds, and the cost of taking care of the grounds. It will be credited with the rent of the grounds. An account will be opened with each building or department, and each account debited with its proportionate part of the ground rent, the sum of these debit items equalling the ground rent credited to grounds. Besides the ground rent, each building will be debited with interest, taxes, depreciation, repairs, etc., and credited with the rent of the building. The rent of the building in turn is debited against accounts opened with each of the important tools, or with groups of tools. These tools in turn are credited with the tool rent which is debited against the accounts opened with the different shop orders. The rent of the grounds, of the buildings, etc., need only to be determined and charged once a year, so that no great amount of bookkeeping is involved in having a complete knowledge of all of these items and in correctly charging them against the proper part of the product.

When we come to consider what equipment and personnel are employed, when a given operation is performed in the usual manner, we find that practically everything in the factory is used for the purpose. A tool is used to perform the operation, a building is needed to house the tool, a power plant is needed to furnish the power, a workman is needed to control the tool, a foreman to direct the workman, a paymaster to pay him, etc. However, by the use of these several items all of the charges occasioned are taken care of in a very simple manner. The cost of the power plant, the building, the plant and the tools are parts of the tool rent. The cost of the foreman and the paymaster, etc., are a part of what might be properly called the "labor rent," but which is usually known as the labor burden. The cost of material in like manner includes many items. In addition, if our bookkeeping system is more or less imperfect, we may charge a greater or less amount of overhead expense, making this charge proportional to the sum of the known charges.

#### OPENING AN ACCOUNT WITH A SHOP ORDER

In order to determine the manufacturing cost of a given shop order, we must open an account with that order. That account will be debited with the true cost (not the prime cost) of all the materials used or destroyed in manufacturing that particular shop order. In this way the order is charged with its appropriate share of the cost of purchase, transportation and storage of all the materials used in its manufacture. The order is debited with the rent of the tools, erecting spaces, etc., utilized in its construction. In this way it is caused to bear its appropriate share of the cost of maintaining the grounds, buildings, tools, etc. It is debited with the wages paid to the men who perform work upon it and with the "labor rent" or labor burden already described. In this way it is made to bear its proportional part of the expense for labor and administration. Finally, it may be debited with a certain amount of expense, which it is inconvenient or impossible to assign in any other way, and which is made proportional to the sum of the other debit items.

Each of these items must of course be credited on another account. The cost of materials is credited to an account opened with materials and which may be subdivided among the different classes of materials. For instance, we may open accounts with cast iron or castings, with bar steel, with tool steel, with bolts and nuts, etc. The labor account is credited with the items of labor and labor burden. The tool account, which may be subdivided into accounts with individual tools or groups of tools, will be credited with the items of tool rent. Finally, the overhead expense account will be credited with its item. It is usually advisable to keep the accounts of the selling departments separate from those of the manufacturing departments. The simplest way to do so is to credit the order number account with the actual cost of manufacture, which balances the account, and to debit an account opened in a separate set of books kept for the sales department with this cost. The system of bookkeeping employed by the sales department will show the profits realized on the different classes of product and also the cost of selling. We are not concerned with those costs or profits, however, since we are considering only the cost of manufacture.

#### ACCOUNTS WITH SHOP MACHINES

In order that the assets and liabilities of the business may be shown at all times it is not suffi-



cient to keep an account with each tool or group of tools or other unit of equipment, but a depreciation account for each unit must also be kept. Let us suppose that an account is kept to show the earnings of a certain tool, say "Planer No. 1." On the debit side of this account will appear each year an item of interest on the first cost of the tool, an item of depreciation, an item of insurance, an item of taxes, and sundry items for repairs. In addition to the above fixed charges there will be a charge for power, a charge for building rent, and possibly other charges. The sum of all of these charges constitute the expense of operating the tool for a year. By dividing the annual expense of operation by the number of working hours, the hourly rent for the tool is determined. Whenever the tool is employed on a job the tool account is credited with the hourly rental for the number of hours which it is actually employed, and (as has already been explained) this item is balanced by a debit item on shop order account. Of course it is impossible to foresee the number of hours which the tool will be employed, and it will follow that the two sides of the account will seldom if ever balance at the end of the year. The difference represents either a profit or a loss, and the records give us an idea of the probable number of working hours for the following year.

The tool earnings account, however, gives us no idea of the actual value of the tool. This must be determined from a depreciation account which we may term "Depreciation Planer No. 1." This account will be debited with the cost of the planer. It will be credited each year with the annual depreciation, together with interest on the accumulated depreciation fund. The balance, which is a debit balance, represents the book value of the tool and is an asset of the business.

Another account must be opened with "Interest." This account will be credited with the interest debited against the tool and debited with the interest credited in the depreciation account. The balance represents a profit or loss of the business and is closed into the profit and loss account. The interest account will, of course, be a general interest account and will not be kept for a particular tool or other piece of property or equipment.

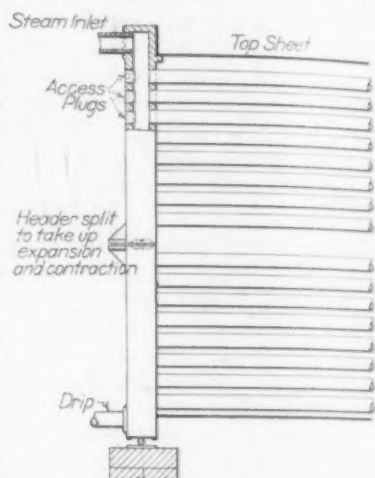
#### ACCOUNTS WITH DIFFERENT KINDS OF STOCKS

In order to show the condition of the stock and the cost of different items of stock, an account may be opened with each particular kind of stock. For instance, we may open an account with "Drill Rod." This account will be debited with the cost of drill rod and the transportation charges each time that such stock is purchased, and at the end of the year, with the rent of the storage space which the stock occupies and a proportion of the cost of the stock keeping and purchase. By dividing the total cost by the number of pounds purchased the value of the material may be determined. Each time that drill rod is withdrawn from stock the account is credited with the value of the stock so withdrawn. In the long run this account will balance, except for loss in stockkeeping or mistakes or omissions in accounting. The difference between the two sides of the account represents stock on hand and is an asset. By a properly devised system of accounting based upon correct principles of cost classification, it is possible to exhibit upon the books of the firm the correct state of its assets and liabilities, the actual cost of given materials and operations, the earnings and cost of operation of equipment, the sources of the profits, and in general, to answer any questions which the manager may find it necessary to ask.

## An Improved Form of Hot Blast Heater

The Green Fuel Economizer Company, Matteawan, N. Y., has recently brought out a new type of coil for use with the air heaters employing steam or hot water that are installed in connection with fans. In the design of the heater efforts have been made to eliminate air binding and water hammer and to reduce the strains upon the joints as well as making the interior of the tubes accessible for inspection and cleaning and enabling tubes to be renewed without disturbing others.

The tubes of the heater, which are straight and are all of the same length, are expanded into front and rear headers, consisting of one-piece boxes with holes for the reception of the tubes and screw plug



Partial Elevation in Section of a New Box Header Type Hot Blast Heater Coil Showing Access Plugs for Getting at the Tubes and Rollers to Allow for Expansion and Contraction

holes for access in rolling in the pipes and for inspection, cleaning, etc. The holes for the tubes are reamed and the ends of the tubes turned to make them smooth before rolling them in or expanding them. The tubes are expanded directly against the cast iron of the rear header, while copper ferrules are used in the front one. The access plugs over the ends of the tubes are made steam tight by applying a composition.

The front header is divided into two parts with rollers between them and between the lower section and an iron plate upon the foundation. In this way, it is emphasized, the free and independent movement is permitted. The sides of the headers are set tightly together, which, it is pointed out, does away with any special housing or covering on the two sides. Only the top or the bottom of the heater has to be inclosed, depending upon whether the heater is to rest on the floor or to be suspended close to the ceiling. If it should be desired to apply insulating material this may be done readily, as the access plugs are of the socket type and are flush with the surface of the heater.

The steam, hot water or other fluid used by the heater is introduced through a connection in the upper part of the header and flows through slightly inclined tubes to the rear header. Here it descends and returns through the lower half of the tube bank to the lower portion of the front header, and from there it passes to the drip or outlet connection. In this way it is pointed out the circulation is positive without short-circuiting or pocketing, and the steam is relied upon to assist the air and water of condensation in the natural direction of flow by gravity.

At the Sixth International Congress of Mining, Metallurgy, Engineering and Economic Geology, to be held in London, England, July 12 to 17, 1915, there will be four sections. Section 1 will be devoted to mining, embracing coal mining and metalliferous mining; section 2 to metallurgy, covering chemical and physical metallurgy; section 3 to engineering, and section 4 to economic geology.

## Providing a Shop Drinking Water System

(Continued from page 1401)

## EXPENSE

The expense of operating a drinking water system is surprisingly small. Assuming a water supply of one gallon per person, and providing for a circulating pump and pipe system permitting the circulation of 20 gallons per person per working day, with a loss of four to five degrees in the circulating system, and a cooling effect of 20 degrees on the incoming water, it is easy to calculate that 110 to 160 persons can be supplied with water by a machine having a refrigerating capacity of one ton per 24 hours' operation. The extreme range of refrigerating capacity, based on one-half gallon per person per day for office buildings, up to two gallons per person per day for furnace work, is from 50 to 200 persons per ton refrigerating capacity, the refrigerating machine capacity being on the 24-hour basis.

Assuming that 100 persons can be supplied with drinking water in a given case, by a refrigerating machine of one ton capacity per 24 hours, the cost of operating the machine with electricity at six cents per kilowatt hour would be nine cents per hour. Allowing one cent per hour for water for the refrigerating condenser, the total cost of operation for the nine-hour day would be 90 cents. The power required for the circulating pump is very small, costing considerably less than one cent per hour in any case; so that \$1 per day would be ample for the operating cost of the drinking water system per 100 persons, on the liberal basis above used.

## DRINKING FOUNTAINS

The outlets for the drinking water system will be naturally drinking fountains of some selected type. There are now a large number of makers of sanitary fountains, so that the choice is wide. Most of these fountains have automatic closing valves, worked by the foot or by the hand, when it is desired to turn on the water for drinking. The amount of water wasted by a drinking fountain may be from two to five times the amount of water actually drunk, and this factor is naturally a large one in deciding upon the amount of refrigeration to provide in connection with a drinking water system.

However, remembering that the exact temperature of drinking water is not a matter of serious consequence, providing only it is palatably cold, no serious harm can be done if the water consumption turns out to be a little greater than was anticipated. In such a case the drinking water may reach the outlets, in very hot weather, a few degrees higher than was expected. More harm will be done by having the drinking water too cold than by having it not cold enough. It is very desirable, therefore, to provide a thermostat in the drinking water system by which the circulation of brine, or the operation of the refrigerating machine, can be cut off when the drinking water reaches a predetermined minimum temperature. Generally, a temperature of 50 to 55 deg. at the entrance of the circulating system will be found quite low enough to provide water at an agreeable drinking temperature.

The Seneca Iron & Steel Company, Buffalo, N. Y., manufacturer of black and galvanized sheets, is preparing to build an extensive addition to its plant in south Buffalo. The contract for new buildings, taking 400 tons of steel, has been awarded to the Lackawanna Bridge Company.

## Progress in the Smelting of Mayari Ore

(Continued from page 1389)

resulted in handling the slag and obtaining good iron.

A slag volume of approximately 1740 lb. per ton of iron was maintained in the various tests. A small amount—6 per cent. of mill cinder running about 29 per cent.  $\text{SiO}_2$ —seemed to help the slag conditions by increasing the  $\text{SiO}_2$  about 2 per cent. in the slag.

The normal Mayari pig iron analyzing about 1.00 per cent. Si., 0.03 S., 1.00-1.20 Ni., 2.00-2.40 Cr., presents very little grain in the fracture. This iron has as a rule a large crystalline structure somewhat similar to spiegel, although with higher silicon content and under conditions of slow cooling it is not uncommon to find fractures exhibiting a full grain. However, the tendency of chromium in pig iron seems to be to drive the carbon into the combined form, thus giving the spiegel effect. One great peculiarity of this iron is its high total carbon, which in our recent tests averaged 4.65 per cent., and the high ratio of combined to graphitic carbon.

The results show very little if any advantage of lime nodules over straight Mayari nodules, but the chances are the advantages of the former would be brought out to a more marked degree in a larger furnace, where the stock column is larger and consequently where more benefit would be derived from having the lime thoroughly mixed throughout the ore charge.

In spite of the favorable results obtained on this small furnace the great question now is, "How will a large furnace work on similar mixtures?" The results will no doubt prove better on a large furnace. This point will be demonstrated at Sparrow's Point by a conclusive run in the near future as soon as the coarse nodules arrive from Cuba. Already a short test run was made on No. 1 furnace at Sparrow's Point, and the results were very encouraging.

## FURNACE DESIGN

With conditions relating to quality of coke and preparation of the ore in such an unsettled state and demanding the undivided attention of everyone concerned, there was but little opportunity to experiment with any radical departures in furnace lines. The furnaces used for experimental work were the same ones called on to turn out the regular grades of iron, so that with the limited facilities no changes could be made, even if desired, which would effect the furnace operations to a marked degree under any one of these varied conditions. At Steelton, the furnaces as at present lined have given fairly good results on Mayari ores, at least, as good as could be expected in the face of other difficulties.

As to the question of bosh angles, No. 1 furnace, Steelton, has 71 deg.; No. 2 furnace, 76 deg.; No. 3 furnace, 74 deg., and the latest lined No. 4 furnace, 77 deg. With coke and ore troubles fast improving, we are inclined to favor the larger hearth, steeper and shorter bosh for Mayari ore practice, yet it is doubtful if the 80 deg. bosh furnace will work well on these more refractory ores. However, time and experience will, no doubt, prove the correctness of this statement. Up to the present, it can be stated as a fact, that practically no difference can be noted between the working of Mayari ore on a 74 deg. bosh furnace as against that on a 76 deg. bosh; therefore, I see no reason why even a steeper bosh should not work well.



# The Machinery Markets

Some scattered indications of improvement in the machinery trade are noticed, though in several important centers there has been no change that is discernible as yet. On the whole, trade is quiet, if not dull. In the New York territory more factories are going on longer hours and there is some encouraging buying by makers of automobile parts or accessories. New England has not yet profited by the better sentiment, but the worst is believed to have passed. Chicago is feeling a depressing lack of inquiries, though special lines are selling well for export. In Cleveland automobile accessory manufacturers are in the market and there is some improvement in single tool orders, though the foundry trade is unimproved. In Detroit also there has been better movement of single tools, with the automobile manufacturers still out of the market. Single tools and small lots have been in more active demand in Milwaukee, and second-hand tools are moving slowly. The St. Louis market continues unsatisfactory. In the Central South there is a more cheerful tone, because of an active demand for ice-making and a few other lines of machinery. Small engines alone are moving actively in the Birmingham territory. In Texas there is a good demand for machinery used in the cotton industry. Agricultural machinery leads all other kinds in the Pacific northwest, although the Alaskan and export shipments are fair in all lines.

## New York

NEW YORK, June 3, 1914.

District managers are encouraged by reports from salesmen that they find a growing number of factories going on full time, or at least increasing their working hours, a fact which is regarded as a good indication for a betterment in the sale of machinery in the not distant future. Current inquiries are practically as few as the sales. Another symptom on which the trade can base hope is that Eastern railroads are buying a little more freely of miscellaneous materials, particularly track supplies, the requirements being based on necessity, and it may be that before long purchasing agents will be permitted to buy some of the shop equipment known to be needed. The best recent buying was the purchase of several machine tools by the Sears-Cross Company, Bush Terminal, Brooklyn, which has secured an attractive contract for making automobile parts. The Dunlop Wire Wheel Company, Long Island City, which was a purchaser a few months ago, is understood to be contemplating the buying of duplicate equipment and the Hyatt Roller Bearing Company has recently bought some automatic screw machines, all of which indicates that the plants of automobile parts and accessory makers have been the busiest in this section.

The Pirkl Foundry Corporation, Orchard street, Astoria, New York City, has been incorporated with a capital stock of \$25,000 by William Bogen, D. R. Schnepf, and others. It has taken over the business and plant of the John Pirkl Iron Works.

H. D. Best & Co., 320 Fifth avenue, New York City, have received the general contract to erect a three-story reinforced concrete box factory, at the foot of Tenth street, Long Island City, N. Y., for the Standard Oil Company. C. A. Ellis, care of the Standard Oil Company, 26 Broadway, is the engineer.

The Jacob Mattern Wagon Company, 215 West Fifty-third street, New York City, has awarded the contract for a six-story brick and stone factory, 37 x 92 ft., at 238-240 West Fifty-third street, to cost about \$30,000. H. A. Koelble, 114 East Twenty-eighth street, New York City, is the architect.

Merck & Co., 45 Park place, New York City, manufacturing chemists, are building a one-story addition to their factory at Rahway, N. J., to cost about \$45,000. Very little machinery equipment will be required.

The New Rochelle Foundry Corporation, New Rochelle, N. Y., has been incorporated with a capital stock of \$15,000 by F. E. Holler, 122 Fifth avenue, New Rochelle, and others, to do a general jobbing business. It will build a foundry, 65 x 80 ft.

It is reported that the Linden Water Company, Linden, N. J., will construct waterworks to cost about \$300,000. Plans are not yet prepared.

The city of Morristown, N. J., has sold \$35,000 in bonds for improvements to the water and light plants, etc.

The village of New Paltz, N. Y., has sold \$49,500 of waterworks bonds.

The board of electric light and water commissioners, Penn Yan, N. Y., is receiving bids for the construction of an addition to the power house of the electric light plant and waterworks system. F. Lynn is president.

The Reuther Mfg. Company, Hamburg, N. Y., manufacturer of farming implements, has let the contract for the erection of a factory building, 100 x 100 ft., one story.

Frank Kels, city engineer, Watervliet, N. Y., has prepared plans for a municipal water system to be constructed by the city.

The King Sewing Machine Company, Buffalo, of which W. Grant King is president, will build further additions to

its plant at Rano and Riverside streets and the Lackawanna Railroad, comprising a foundry, 70 x 117 ft., and a factory building, 30 x 150 ft.

The new factory to be erected by the Buffalo Shirt Company at Kehr and Urban streets, Buffalo, will be 150 x 175 ft., L shape, two stories and basement, and to cost \$35,000. Oliver Goldsmith, 752 Main street, is president.

Cooley & Edlund, Syracuse, N. Y., manufacturers of milling machines and special machinery, are having plans prepared for a manufacturing plant to be built at Cortland, N. Y.

## New England

BOSTON, MASS., June 2, 1914.

Little can be added to the reports of recent weeks. The manufacturers have not yet felt the response to the better feeling which seems to pervade commercial and banking circles. Yet the generally expressed sentiment is that the worst is over, and that from now on things should improve, taking into consideration, of course, that the summer months are here, with their natural enervating influence. Few people expect any radical change before early fall.

In Providence, R. I., and Attleboro, Mass., which together constitute the greatest jewelry manufacturing center of the country, and probably of the world, business is actually flat. A few of the hundreds of jewelry manufacturers are busy, but for the most part they find things unusually dull. The builders of the equipment that serves them naturally feel the effect of this condition, yet they are not running very low, because of outside orders and because of the desire to replenish stocks.

Announcements of new buildings for manufacturing purposes are not numerous—in fact they are few and far apart as compared with prosperous years. Nevertheless, a great many concerns have plans for extensions and are waiting only until the tide has really turned to proceed with new construction.

The Navy Department is preparing the land for the large torpedo factory which is to be erected at the Torpedo Station, Newport, R. I. The building will be 496 ft. long, which is twice the size of the present structure. Work will commence early in July and will be rushed to completion. The equipment will amount to a large figure.

The Farrel Foundry & Machine Company, Ansonia, Conn., plans to build an erecting shop, of brick and steel.

The Plume & Atwood Mfg. Company, Waterbury, Conn., is to build an additional factory, 50 x 180 ft., five stories, of mill construction.

The Page Machine Company has been organized at Haverhill, Mass., to manufacture a machine for the making of heels for shoes. The factory will be located in the building of Irving L. Keith, Haverhill, manufacturer of shoe findings, the treasurer of the new corporation. H. E. Harriman is the president and E. L. Page, the inventor of the machine, is the third director. Heretofore heels have been made by hand. The Page machine will produce them automatically.

The Ball & Roller Bearing Company, Danbury, Conn., has been incorporated under the laws of Connecticut with a paid-in capital of \$10,000. The organizers are Lewis R. Helm, J. Henry Roth and William C. Barrett, all of Danbury.

A project is under way to combine the business of the Bigelow Carpet Company at Clinton and Lowell, Mass., into that of the Hartford Carpet Company, Thompsonville, Conn. The price which the latter corporation would pay for the Massachusetts properties is said to be about \$3,000,000.



## Philadelphia

PHILADELPHIA, PA., June 1, 1914.

The American Ice Company, Sixth and Arch streets, Philadelphia, is building a two-story machine shop at Thirtieth street and Columbia avenue to cost about \$4500. It is to be equipped for all kinds of pipe work and machine repairs to refrigerator plants.

Thomas Janney & Co., 315 North Third street, Philadelphia, are making additions to their tannery at Vankirk and Milnor streets.

Plans have been drawn by William Cookman, architect, Broad street station, Philadelphia, for a small power house for the Pennsylvania Railroad, for the North Philadelphia passenger station, to be used in operating air compressors for the signal system and also for heating the station. D. M. Perine, superintendent of motive power, Pennsylvania station, New York City, will purchase, through the purchasing agent of the railroad, all necessary machinery, etc.

The L. D. Caulk Company, Milford, Del., manufacturer of dental materials, is building a three-story and basement laboratory. C. C. Buck, Main street, Camden, N. J., is the architect.

The town of Greensboro, Md., has voted to issue \$20,000 in bonds for establishing waterworks.

## Chicago

CHICAGO, ILL., June 1, 1914.

A depressing absence of inquiry for machine tools of the general manufacturing type is the common experience of local machine-tool handlers. Sales of special tools in the form of fabricating machinery and presses are reported for export shipment, but domestic trade is inactive even among the specialty lines. The Louisville & Nashville Railroad has closed for shop equipment the aggregate value of which will closely approach \$50,000. The hydraulic presses and auxiliary apparatus were placed in Chicago, but the major portion of the remaining machinery, consisting very largely of tools for that road's car shop, was placed in other markets. Expressions of opinion regarding the outlook coincide in the belief that a radical improvement is to be expected in the fall. In the interim the trade appears resigned to a season of very restricted demand.

As a part of the equipment of the new plant of the Chicago Carriage & Trimming Company, 3514 South Michigan avenue, there will be installed a blacksmith shop and a wood-working plant.

The plant of S. Obermayer & Co., Chicago, manufacturers and jobbers of foundry supplies, was damaged by fire to the extent of \$20,000.

The Van Dorn Girder Plate Company, Chicago, has been incorporated with a capital of \$25,000 to engage in the fabrication of plate work for railroad and electric car construction. It is organized by William S. Van Dorn, 2325 South Paulina street. The same interests have also organized as the Van Dorn Coupler Company for the purpose of manufacturing couplers for railroads, cars and auto trucks. The capitalization of the latter company is \$10,000.

The Western Engineers' Supply Company, Chicago, has been incorporated with a capital of \$5000 to manufacture mechanics' and engineers' supplies by M. J. Tearney, 910 South Michigan avenue, J. J. Kelly and N. J. Tearney.

Charles G. Luft, Alton, Ill., is erecting a two-story building and will operate a machine shop on the ground floor.

The Haish Implement Works, DeKalb, Ill., suffered a loss estimated at \$275,000 as a result of a fire which destroyed a large quantity of manufactured stock as well as the equipment in some of the manufacturing departments.

The Wishart Ice Machine Company, Springfield, Ill., has been incorporated with a capital of \$40,000 to manufacture refrigerating machinery. The incorporators are J. O. and William Wishart, T. M. Dolan, and others.

The Mt. Sterling Sewer Company, Mt. Sterling, Ill., has been incorporated by William Purcell, E. F. Crane, W. D. Thompson, and others, and will install a disposal plant and other equipment.

The Macomb Sheet Metal Works, Macomb, Ill., has increased its capital stock from \$40,000 to \$60,000, and will add new equipment.

The Structo Mfg. Company, Freeport, Ill., has increased its capital stock from \$25,000 to \$100,000, to extend its equipment, etc.

The Gallatin Coal & Coke Company, Equality, Ill., has increased its capital stock from \$25,000 to \$150,000 to add to its mining equipment and otherwise extend operations.

The Meyer Furnace & Supply Company, Peoria, Ill., has been incorporated with a capital stock of \$25,000 by Dirk and George F. Meyer and George Harms to manufacture furnaces, etc.

The city of Waucoma, Iowa, has voted \$12,000 of bonds for the erection of an electric light plant.

The Crookston Cordage Company, Crookston, Minn., has been organized with a capital of \$75,000 and is preparing plans for the building of a plant, the cost of which, including machinery, will approximate \$35,000.

The town of Britton, S. D., will receive bids through the city auditor until 8 p. m. June 8, for a sewer system and sewerage treatment plant.

## Milwaukee

MILWAUKEE, WIS., June 1, 1914.

A résumé of May business shows a decided falling off as compared with the corresponding period a year ago. The month held its own fairly well in comparison with previous months of this year. Prospects for June are none too bright, but machinery men believe an improvement is due, and there seems to be some foundation for the expectancy, judging from the better inquiry by prospective buyers. All of this business, however, is in single tools or small lots. Second hand tools are moving slowly, but fortunately the market is not flooded.

The Thompson Brothers Boat Mfg. Company, Peshtigo, Wis., is about to build a large addition and is already purchasing additional wood and metal working tools.

The Atlas Engineering Company, Milwaukee, incorporated with a capital stock of \$150,000, is considering plans for the erection of a factory for the building of engines.

A fire which swept the plant of the Sheboygan Cigar Box, Lumber & Mfg. Company, Sheboygan, Wis., causing an estimated loss of \$30,000, resulted in the almost complete destruction of this company's machine shop.

The North Side Auto Company, Eau Claire, Wis., is building an addition, 28 x 50 ft., to be used for repair and general machine shop purposes.

The Viroqua Creamery Company, Viroqua, Wis., closes bids June 10 for the erection and equipment of a \$25,000 dairying plant, with steam power. Bolton & Sadler, Janesville, Wis., are the architects.

The Minneapolis, St. Paul and Sault Ste. Marie Railway, Minneapolis, Minn., is preparing to completely rebuild its ore dock at Ashland, Wis., into a modern steel and concrete dock, with electrical equipment throughout.

The Milwaukee board of school directors, Milwaukee, will purchase manual training equipment for the new Washington high school. The architects are Van Ryn & DeGelleke, Milwaukee. Frank M. Harbach is secretary.

The C. Mattison Machine Works, Beloit, Wis., makers of turning machinery and belt sanders, has broken ground for a machine shop, 70 x 120 ft., and will purchase additional tools for producing wood-working machinery.

Albin Peterson, Peshtigo, Wis., will build a plant for the manufacture of interior finish and fancy woodwork.

The Sheboygan Cigar Box, Lumber & Mfg. Company, Sheboygan, Wis., is preparing to rebuild its plant, destroyed by fire May 20 with a loss of \$37,000. The new works will require a complete new equipment of wood-working and power machinery.

The Giddings & Lewis Mfg. Company, Fond du Lac, Wis., is buying a considerable list of new machine tools and equipment in order to increase its capacity for manufacturing saw-mill machinery and equipment. No new construction will be done this year, but the investment in new machinery will reach \$30,000. C. E. Cleveland is president and manager.

The Oscillating Sleigh Company, Menomonie, Wis., has been purchased by C. G. Crocker, who will continue the business under the style of Menomonie Sleigh & Wagon Company. Mr. Crocker plans additions and the installation of new equipment.

A \$60,000 high school with manual training department will be erected at Ladysmith, Wis. Plans are by Parkinson & Dockendorff, architects, LaCrosse, Wis.

## Indianapolis

INDIANAPOLIS, IND., June 1, 1914.

The Hercules Forge Company, Indianapolis, has been incorporated with \$25,000 capital stock to manufacture forgings. The directors are J. H. Holiday, Jr., O. Motherhead and A. Vonnegut.

The Hayden Mfg. Company, Fort Wayne, Ind., has been incorporated with \$10,000 capital stock to manufacture motor accessories. The directors are Van B. Perrine, R. C. Diserens and W. H. Scheiman.

The Alexander Spreader Company, Lebanon, Ind., has been incorporated with \$12,000 capital stock to manufacture spreaders. The directors are I. P. Hooton, Adolphus Wysong and W. T. Hooton.

The Southern Indiana Power Company, with headquarters at Bloomington, Ind., has been sold to a new company of which Chester P. Wilson, Indianapolis, is president. The capital stock is \$800,000. The company supplies electric power. It is said to be the purpose of the new owners to

build another plant on White River, at Shoals, Ind., to supply power to Southern Indiana cities.

The Shirley Radiator & Foundry Company, Indianapolis, Ind., manufacturer of radiators, boilers, etc., is building a large addition to its plant at Beech Grove, to be used largely for warehouse purposes.

The Loogootee Water Company, Loogootee, Ind., has been incorporated with \$25,000 capital stock as a public utility company. The directors are J. W. Van Hoy, C. C. Van Hoy and George A. Harrup.

The Hincer Mfg. Company, Shoals, Ind., has increased its capital stock \$50,000.

The City Council, Bloomington, Ind., has voted \$15,000 for the improvement of its water works plant.

The Gary Auto Mfg. Company, Gary, Ind., has been incorporated with \$50,000 capital stock to manufacture automobiles. The directors are G. E. Paff, L. G. Throckmorton and W. C. Flanagan.

The Nutter Gear Wood Company, Seymour, Ind., has been incorporated with \$12,000 capital stock to manufacture wooden products, etc. The directors are A. Nutter, H. C. Johnson and J. H. Andrews.

## Detroit

DETROIT, MICH., June 1, 1914.

May was rather a dull month with most of the local dealers and totals figured about the same as for April. There has been a slight increase in activity during the past week, mainly due to a better run of single tool orders. There seems to be no increase in inquiries so that material betterment in the market is not looked for at present. The automobile manufacturers continue to keep out of the market. The second hand machinery market is dull. Reports from the foundry trade indicate that business is picking up slightly. New construction work has fallen off somewhat but contractors are steadily engaged.

The Lewis-Hall Iron Works, Detroit, has been incorporated with a capital stock of \$250,000 to take over the structural iron and steel business formerly conducted by and in the name of Henry B. Lewis. The company, which already has a large plant, plans to broaden its field of operations and gradually increase its manufacturing facilities. Henry B. Lewis is president and treasurer, and Harry S. Hall, vice-president and general manager.

The plant of the Michigan Brass & Foundry Company, Detroit, has been taken over by a syndicate headed by Louis Wurzer and Frank Berry. The factory, which has not been operated recently, will at once be reopened.

The Detroit Instrument Company, Detroit, has been incorporated with \$200,000 capital stock to manufacture speedometers and other automobile accessories. Frank G. Smith, Paul H. Deming and Rufus G. Lathrop are the incorporators.

The Peninsular Stove Company, Detroit, has purchased a tract of one and one-half acres, on which are several buildings, adjoining its present plant. Some improvements will be made later.

The Golden Mfg. Company, Detroit, has been incorporated with a capital stock of \$10,000 to manufacture electrical devices. Victor and Max K. Golden are the principal stockholders.

The Efficiency Machine Company, Detroit, has been incorporated with a capital stock of \$5000 to manufacture tools, dies and automobile parts. Glenn J. Walker and William R. Kennedy are at the head of the new enterprise.

The Edmond-Klein Company, Detroit, has been incorporated with \$7000 capital stock to take over the ornamental and structural iron business formerly conducted under the style of Edmond S. Klein. The company has a plant at 395-7 Woodbridge street.

The Lininger-McHugh Company, Detroit, has been incorporated with \$10,000 capital stock by William Lininger and Philip A. McHugh, to manufacture automobile accessories.

The iron foundry and boiler shop of the John H. Davies Company, Ludington, Mich., were destroyed by fire May 25, entailing a loss of \$25,000. The plant will probably be rebuilt.

The Port Huron Lumber Company, Port Huron, Mich., has begun the erection of a large saw mill to replace the one recently destroyed by fire. The company will also erect a plant for the manufacture of interior finish.

The Fenn Mfg. Company, Charlotte, Mich., manufacturer of small farm tools, is planning an enlargement to its factory.

It is announced from Jackson, Mich., that the Union Steel Screen Company will build a foundry for the manufacture of gray-iron castings.

The lighting committee of the City Council, Kalamazoo, Mich., may purchase one 30-kw. transformer and a motor generator set for the municipal electric light plant.

The McMullen Machinery Company, 64 Ionia avenue,

Southwest, Grand Rapids, Mich., has increased its capital stock from \$15,000 to \$30,000 and is enlarging its plant facilities.

The John D. Raad Chair Company, Grand Rapids, Mich., is building a new plant, the building to be of brick and steel construction, four stories, and to cost about \$115,000.

## Cleveland

CLEVELAND, OHIO, June 1, 1914.

Dealers find some encouragement in the fact that two lists have come out from makers of automobile parts and accessories in Ohio, each being for a number of machines. One of these lists is expected to be closed shortly. The market has taken on a slightly better tone and there is some improvement in the volume of single tool orders. An absence of an improvement in general manufacturing conditions, however, would indicate that the slightly improved demand for machinery will not continue long. A local manufacturer is doing a fair volume of business in locomotive cranes but generally the demand for handling equipment is dull. Conditions in the foundry trade show no improvement.

The city of Cleveland, through its commissioner of purchases, will receive bids June 11 for three centrifugal boiler feed pumps and for a concrete mixer.

The Cleveland Machine & Knife Company, Cleveland, has increased its capital stock from \$25,000 to \$60,000.

The Buckeye Machine Company, Lima, Ohio, has acquired a three-acre site on which it will shortly begin the erection of a new plant. The main building will be of brick, 60 x 150 ft. The company makes gas engines.

Robert Greer, Delaware, Ohio, manager of the Greer Road Machine Company, has taken steps to secure the building of a foundry. The project has the support of the local Commercial Club and it is stated that funds will be secured for erecting the plant.

The Owens Bottle Machine Company, Toledo, Ohio, is figuring on about \$15,000 worth of machine tools for equipping its machine shop. It is expected that this business will be placed shortly.

The director of public service, Akron, Ohio, will receive bids until June 16 for a sewage treatment plant.

The Newby Mfg. Company, Youngstown, Ohio, has been incorporated with a capital stock of \$10,000 by William Newby, and others, to manufacture insulators and other porcelain ware.

A special election will be held in Norwalk, Ohio, June 22, to vote on the question of building a \$120,000 municipal electric light plant.

The Standard Motor Company, Warren, Ohio, has purchased a site on which it will build a factory building, 75 x 200 ft., with two wings, each 35 x 70 ft. One of the wings will be used as a machine shop. Machinery equipment will probably be required.

## Cincinnati

CINCINNATI, OHIO, June 1, 1914.

The new developments in the local carpenters' strike will doubtless clarify the labor situation to a considerable extent, provided the employers' association members adhere to their announced policy of operating open shops. The supply of all kinds of labor, both skilled and common, is above normal, and it is generally believed that the employers could not have selected a more opportune time to settle a vexatious question that has retarded building operations for some time.

There is no improvement in the machine tool trade; on the other hand, a number of plants have been compelled to curtail production to avoid accumulating burdensome stocks. This has necessitated laying off additional men, and, with few exceptions, local shops are operating with comparatively small forces. Business also continues quite dull with the machinery dealers, as there is very little buying in this immediate section. The second-hand machinery houses report a slight improvement. The jobbing foundries are still operating to only about 50 per cent. of capacity.

The Dalton Adding Machine Company, Poplar Bluff, Mo., has acquired the plant of the Dana Mfg. Company, Norwood, Ohio, a Cincinnati suburb, and will soon commence moving its equipment to the new factory. A varied assortment of machinery will be needed, but no details are yet available as to the company's wants. The company employs approximately 1000 men at its present location, and this force will be augmented as soon as the new factory is ready.

The Dana Mfg. Company, Norwood, Ohio, manufacturer of hardware specialties, has disposed of its business to the Alaska Freezer Company, Winchenden, Mass. It is understood that the new owner will build an addition to the plant of the Dalton Adding Machine Company, which recently acquired the Dana factory.

The Ohio Ballast Company, Cincinnati, has acquired a site at 327 Hunt street, on which it expects to erect a tippie for handling crushed stone and gravel.

The Interstate Stone Company, Lewisburg, Ohio, has been incorporated with \$40,000 capital stock to operate a quarry and stone-crushing plant. E. T. Paul is one of the principal incorporators.

The Lagonda Mfg. Company, Columbus, Ohio, has let contract for the large addition to its plant, recently mentioned, to George B. Hicks, South Charleston, Ohio. Work will be commenced at once.

J. Keys, care of the Reichert Machine Company, Dayton, Ohio, is interested in a company formed to manufacture a newly patented lawn sprinkler.

The Ohio Electric Power Company, Athens, Ohio, contemplates erecting a large electric lighting and power plant near that city. Particulars are not yet available.

The Belmont Stamping & Enameling Company, New Philadelphia, Ohio, intends erecting an addition to its plant at an early date.

The Maxwell Mfg. Company, Newcastle, Ind., has had plans prepared for an extensive addition to its automobile factory.

The Louis Duemer & Sons Company, Hamilton, Ohio, is erecting an addition to its pattern shops that will be used for the manufacture of warm air furnaces. A sheet metal shop will also be added.

The Economy Furnace & Heater Company, Columbus, Ohio, has been incorporated with \$30,000 capital stock to manufacture warm air heaters. F. R. McGrew, of Columbus, is one of the principal incorporators. The company's plant will be located at Wellston, Ohio.

R. W. Goddard, Wellston, Ohio, is interested in a company being formed to erect a large brick plant.

The Springfield Flooring Company, Springfield, Ohio, has been incorporated with \$15,000 capital stock to operate a plant for making hardwood flooring. H. J. Churchman is one of the principal incorporators. Only a small lot of wood-working machinery will be required.

## The Central South

LOUISVILLE, Ky., June 1, 1914.

A decidedly more cheerful tone is in evidence in the local machinery market. More prospects have developed, and the fact that sufficient orders have been received to keep the plants running only a little below the normal schedule has encouraged the trade. Ice machines are in better demand, for though it is now too late to equip plants for this season there is a tendency to build one year for use the next. Ice is also getting to be an all-year-round proposition with many consumers, and thus the machinery end of the business is not such a strictly seasonable line as it has been. Building operations are taking a good many boilers. Manufacturers of oil engines report a good demand, many small electric light plants in this territory being operated with units of that character. The drouth which has been in evidence for the past month is alarming concerns which sell the farm trade.

William Schuff & Co., Louisville, tanners, are buying additional motors for electric drive installation. General Electric equipment has been purchased chiefly thus far. Fred W. Wagner may be addressed.

The East End Brick Company, Louisville, has purchased a site for a new plant and in about 90 days will purchase equipment for a steam power plant, in addition to special and transmission equipment. P. M. Crane is general manager.

The Embry Box Company, Louisville, is planning the installation of an automatic sprinkler system. Harry W. Embry is secretary and treasurer.

The Cottonseed Products Company, Louisville, is in the market for a horizontal boiler.

The Barlow-Moore Tobacco Company, Glasgow, Ky., is now getting prices on equipment for its factory.

The Louisville & Nashville Railroad Company, Louisville, is planning the construction of repair shops at Lexington, Ky., spending altogether about \$1,000,000 in terminal improvements there. C. F. Giles, Louisville, is superintendent of machinery.

The Glass Milling Company, Wilmore, Ky., is erecting a building which will house its milling, ice and electric light equipment. It plans to enlarge its operations considerably.

The Louisa Water & Improvement Company, Louisa, Ky., has started the construction of a pumping station, for which equipment is now being purchased.

Arthur Frank, Somerset, Ky., is equipping a garage and automobile repair shop.

George L. Smith, A. P. and Stanley White, Cadis, Ky., will install hydroelectric equipment in their power plant.

W. W. Gibson & Co., Mayking, Ky., have decided to add planing-mill equipment to their mill.

The Pineville Water Company, Pineville, Ky., will build and equip a pumping station, etc.

The Elkhorn & Shelby Creek Coal Company, Jenkins, Ky., may construct its own power plant. W. J. Christopher is engineer.

The Kentucky State Board of Control for Charitable Institutions, Nashville, will receive bids June 10 for a new 300-hp. water-tube boiler to be installed at the Central State Hospital, Lakeland, Ky. J. T. Neighbors, chief engineer, Lakeland, has the specifications.

Wilson Brothers, Middlesboro, Ky., will equip a garage and automobile repair shop.

The Eagle Bottling Company, Whitesburg, Ky., is now in the market for power and special equipment.

The planing mill of the S. F. McCormick Lumber Company, Lexington, Ky., was burned May 24 with \$40,000 loss. The buildings and equipment were completely destroyed.

Burleigh & Sons, Eddyville, Ky., are erecting an additional plant for the manufacture of hickory handles. A. J. Gunion, manager, is in charge of the purchase of equipment.

The East Jellico Mining Company, Lexington, Ky., has been incorporated with a capital stock of \$400,000 by M. G. Yingling, of that city; J. B. Marsee, general manager, Tinsley, Ky., and C. F. Swetner, Cincinnati, Ohio, and will equip for an output of 1100 tons daily on coal lands in Bell and Knox counties.

The Southern Textile Machinery Company, Paducah, Ky., has increased its capital stock from \$30,000 to \$150,000, and will increase equipment as well as enlarge the scope of its operations.

The Central Coal & Iron Company, Central City, Ky., will build a steel tippie at a cost of about \$20,000.

The Leatherwood Coal Company, Slemp, Ky., has been incorporated with a capital stock of \$40,000 by R. C. and M. Cornett, and others, and will equip coal property for 500 tons daily.

The Elkhorn & Shelby Creek Coal Company, Jenkins, Ky., will develop a daily capacity of 600 tons and also install a power plant at Penny, Ky.

The Gulf Compress Company, Memphis, Tenn., is in the market for a second-hand 40- to 50-hp. boiler for delivery at Vicksburg, Miss. C. S. Kinney is manager.

Kennedy Bros., Monteagle, Tenn., will rebuild their ice plant, which was recently burned.

The Bedford Hoop Company, Shelbyville, Tenn., whose plant was recently burned, has decided to rebuild.

The Citizens Compress Company, Jackson, Tenn., has been incorporated with a capital stock of \$75,000 by O. J. Nance and Thomas Polk and will equip a cotton compress.

J. S. Maday & Son, Mayfield, Tenn., will equip an electric light plant at Camden, Tenn.

The Crescent Cotton Oil Company, 71 Madison avenue, Memphis, Tenn., is in the market for hydraulic press equipment.

## Birmingham

BIRMINGHAM, ALA., June 1, 1914.

The machinery business is quiet, with the exception of a fair demand for small engines. Boilers are dull. The building trades in the Birmingham district are quite active and furnish a good current demand for structural material and appliances.

The Winfield Lumber Company, Gadsden, Ala., has been incorporated by W. W. Shreve, Erie, Pa., and others, with a capital stock of \$100,000. It will operate lumber mills at Tuscaloosa, Covin and Winfield, Ala.

The city of Tuscaloosa has authorized a bond issue of \$100,000 for the improvement and enlargement of the municipal gas plant.

The Standard Portland Cement Company, Birmingham, is completing additions and installations of hydroelectric equipment that will increase the monthly capacity from 40,000 to 80,000 bbl.

The Mobile & Ohio Railroad has apportioned \$1,200,000 of a recent bond issue for additional shop facilities, water and coal stations, etc., in and near Mobile. C. R. Craig, Mobile, is purchasing agent.

The United States Asbestos Company, Robertstown, Ga., has been incorporated with a capital stock of \$100,000 by D. L. Bitner, N. F. Hagood, J. F. Bonner and F. G. Jones.

The Lookout Bending Company, Chattanooga, Tenn., will build a plant at Sulphur Springs, Ga., to manufacture automobile wheel rims and spokes. The capital stock is \$7000.

The Gillett Lumber & Mfg. Company, Tampa, Fla., contemplates the installation of machinery to manufacture kegs, barrels, etc.

The committee on improvements, Washington, N. C., will receive bids until June 17 for constructing a sewer and furnishing a motor-driven centrifugal pump.



## St. Louis

ST. LOUIS, Mo., June 1, 1914.

Dealers in machine tools report no increase in business or inquiries. While crops and general business prospects are regarded by them as encouraging, no one is willing to commit himself to a definite prediction. New enterprises are not being formed with any notable activity, while existing concerns for the most part are willing to content themselves with present capacity and equipment, regardless of the demand for their products, which in some cases is known to be of an encouraging character. Second hand tools are not active. Collections are reported satisfactory.

The Schram Glass Mfg. Company, St. Louis, maker of patented glass jars, has increased its capital stock from \$500,000 to \$600,000 for the purpose of extending its operations.

The University City Improvement Association, University City station, St. Louis, is preparing to equip a municipal gas or electric plant for lighting purposes.

The Otto F. Stifel Brewing Company, 3134 Wyoming street, St. Louis, has plans for the installation of three additional boilers and allied equipment.

George F. Smith, 810 North Main street, St. Louis, will purchase one 275 hp. engine, one 200 kw. generator, two 150 hp. boilers, one 100 hp. motor, one 60 hp. motor and considerable accessory equipment, including an air compressor, a rotary dryer, automatic feeders, gyratory crusher, bucket elevator, waterworks and fire protection equipment, conveyors, etc.

The Kansas City Terminal Company, Kansas City, Mo., John V. Hanna, chief engineer, will equip a machine shop, the tools, etc., to cost about \$25,000.

Tannehill Brothers, Garden City, Mo., will rebuild and re-equip the sheet metal plant burned recently. W. G. Merrifield is the lessee.

The machinery and equipment of the Gorton Mfg. Company, St. Joseph, Mo., has been sold at receiver's sale.

The Holden Ice & Fuel Company, Holden, Mo., will install a 35-ton refrigerating plant, including a direct connected Corliss engine, with three condensers, a 15-ton freezing system and a 15-ton distilling system.

An ice machine of 11 tons capacity will be installed at Kansas City, Mo., by the Theodore W. Mertens Ice & Coal Company.

The Platte City Ice & Cold Storage Company, Tracy, Mo., of which A. P. Fulcher is secretary, will install a 16-ton ice plant, one 25 hp. oil-burning engine, etc.

The Lechtman Printing Company, of which Cusil Lechtman is president, Kansas City, Mo., will install a printing plant equipment to cost about \$50,000.

The Excelsior Tool & Machine Company, East St. Louis, Ill., will erect and equip a large machine shop addition to its plant, about \$50,000 being involved.

The Ouachita Power Company will erect a hydro-electric plant to develop 7000 hp. It plans also to equip a cotton mill. The power house equipment will involve about \$200,000. Construction permission has been obtained. D. L. Phillips, Little Rock, Ark., is manager.

The Jonesboro Blacksmith Company, Jonesboro, Ark., has changed its name to the Jonesboro Machinery Company, increased its capital by \$10,000 and will add new equipment.

The Penrod-Jurden-McCowan Lumber Company, Brasfield, Ark., is rebuilding its plant and is in the market for equipment. Its main offices are at Kansas City, Mo.

The Weber Timber Company, Rector, Ark., will install equipment for hickory and oak dimension stock. H. A. Bennett is president. About \$10,000 will be expended.

R. R. Kirkwood, Lead Hill, Ark., is reported in the market for power and special equipment.

The Oklahoma Metallic Tie Development Company, Coalgate, Okla., has been incorporated with a capital stock of \$15,000 by F. F. Green, J. P. Addison and E. Gentilini and will equip a metal working plant.

The Oil City Motor & Machine Company, Sapulpa, Okla., has been organized to do repairing and building of all parts of an automobile. C. W. Toliver is manager.

C. C. Epps, Bristow, Okla., will install at once a five 80-saw gin and one press expeller mill.

The Delta Cotton Oil Company, Jackson, Miss., organized by S. H. Sample, Shreveport, La.; W. B. Gowdy, and others, will equip an oil mill. Lee Baggett, Jackson, Miss., is engineer.

The Clay County Oil Company, West Point, Miss., will rebuild its plant recently destroyed by fire and will install new equipment to cost about \$10,000, including liner, press, cake-grinding equipment, engine, shafting, conveyors, etc. S. A. Scott is manager.

The Tupelo Oil & Ice Company, Tupelo, Miss., will install a 50-ton refrigerating plant and a 20-ton freezing machine.

Lamar Watson, Greenville, Miss., is in the market for power plant equipment.

A. M. Tynes, Shuqualak, Miss., is in the market for gasoline engines.

The Shreveport Long Leaf Lumber Company, Shreveport, La., of which W. A. Robinson is president, will equip a large mill. Its capital is \$100,000.

The Lafayette Lumber Company, Lafayette, La., has been organized with a capital of \$25,000 and will install a mill.

The Lyon Cypress Lumber Company, Garyville, La., is proceeding with plans for the remodeling of its plant at a total cost of about \$100,000. S. M. Bloss is manager.

E. Scott of Rayville, La., will install an electric light and power plant at Delhi, La.

The town of Melville, La., has voted to establish an electric light plant.

## Texas

AUSTIN, TEXAS, May 28, 1914.

The machinery and tool trade shows considerable improvement over the early part of the month. The demand for cotton-gin, compress and oil-mill machinery continues active. Many sales of road-making machinery are also reported. In Arizona and New Mexico much attention is being given to installing new equipment in mines.

The Bowen Car Initial & Number Recorder Company, Kingsville, will establish a factory for the manufacture of a numbering device. D. B. Gray is interested.

The Dallas & Northwestern Railway Company, Dallas, will construct a power house.

The Oil Belt Traction Company, Phoenix, Ariz., which was recently organized, purposes to construct a large power plant in Oklahoma.

J. H. Fulmen, Parsons, N. M., will install new machinery in mines at Nogal, and construct an electric power plant at Carrizozo, N. M.

The Stone & Webster Engineering Corporation, Boston, Mass., announces that it will spend at least \$1,500,000 in improving its street railroad properties at Dallas. Of this sum about \$300,000 will be spent in enlarging the electric power plant, it is stated. Edward T. Moore is general manager of the Dallas Consolidated Electric Street Railway Company, which is the subsidiary company that operates the system.

R. H. Baker, Austin, and associates, propose to build one or more gas pumping plants.

The Luck Tire & Mfg. Company, San Antonio, will construct a plant there for the manufacture of automobile tires.

Improvements and enlargements to the municipal water works plant at Big Springs, to cost about \$25,000, will be made.

The Moody Calculator Company, Dallas, which has a capital stock of \$100,000, will construct a factory for the manufacture of a calculating machine. Frank W. Beach is manager.

The Trinity Compress Company, Fort Worth, is preparing to rebuild its large cotton compress which was burned. B. L. Anderson is president.

The Mexia Water, Light & Power Company, Mexia, has been organized with a capital stock of \$145,000. The incorporators are W. W. Cook, Joseph Nussbaum and O. H. Brannon.

The El Paso & Southwestern Railroad Company will enlarge its shops and terminals at El Paso. F. L. Hunter, El Paso, is manager of purchases and supplies.

## The Pacific Northwest

SEATTLE, WASH., May 26, 1914.

With the approach of harvest season, and the assurance of extremely heavy grain crops throughout the Pacific Northwest, implements are quite active, keeping local manufacturers well occupied, and there is also a fair demand in the interior for small power units, dairy equipment and grain handling equipment. The demand in other lines is quiet, though there is a fair amount of business for Alaskan and export shipment. Machine tools receive little attention, and inquiries for woodworking machinery are mostly of a small nature, though manufacturers are well occupied with old mill construction contracts.

The Pacific Rubber & Tire Mfg. Company, Seattle, has been organized with a capital of \$25,000. It will erect a factory for the manufacture of automobile tires and tubes. For information address B. L. Gates, care of Gates Jewelry Company, Seattle.

The factory of the Elder Box Company, Tacoma, was completely destroyed by fire, entailing a loss of approximately \$10,000. It will be rebuilt.

The plant of the Lebam Mill & Timber Company, Lebam, Wash., was totally destroyed by fire with a loss of \$300,000. F. R. Brown, president Case & Brown Shingle Company, the owner, has authorized the statement that the mill will be rebuilt bigger and better than before.

The city of Seattle, Wash., will take bids June 5 for three 3750 kw. transformers.

The American Wood Products Company, Spokane, recently filed articles of incorporation with a capitalization of \$200,000. A woodworking establishment including a planing mill, a box factory, etc., will be built and equipped. For further information address Kenneth Durham, secretary, Spokane.

B. F. Davis, Vancouver, Wash., will build a refrigerator factory. Cost \$50,000.

The Vashon Electric Company, Vashon, Wash., announces its intention of immediately constructing a steam generating plant for the generation of electric power. Homer H. Edwards, City Clerk, Tacoma, Wash., is president.

The Common Sense Auto-Lock Company, Ltd., Spokane, recently filed articles of incorporation with a capital stock of \$1,000,000. The incorporators are: W. H. Purcell, R. B. Weber, and others. Richard Weber, 5817 Cedar street, Spokane, is the attorney. A factory will be built.

The Pacific Power & Light Company, Portland, Ore., according to reports, will immediately make needed improvements and extensions to its plant at Pomeroy, Wash.

The Oregon-Washington Railroad & Navigation Company, Portland, has announced its intention of building shops, round-houses and division headquarters in Pendleton, Ore. A site has been secured and it is reported work will begin within a month.

The City Council, Hartline, Wash., will improve the water system. The work includes the installation of new pumps.

S. A. Buck, Eugene, Ore., is preparing to build a box factory.

The Heppner Creamery & Cold Storage Company, Heppner, Ore., recently filed articles of incorporation with a capitalization of \$50,000. The incorporators are A. L. Sparling, O. J. Cox and John Wightman. A creamery and cold storage plant to cost not less than \$20,000 will be built.

Robert W. Jones, McMinnville, Ore., has been commissioned to prepare plans and specifications for a municipal water system which will be installed in Lafayette, Ore., at a cost of about \$25,000.

The town of Emmett, Idaho, is taking bids on a 10 x 12 air compressor, with a 30 hp. motor.

J. W. King, Alpha, Idaho, will build a sawmill to have a capacity of not less than 75,000 ft. per day. Milling machinery will be required.

The Panhandle Lumber Company, Spirit Lake, Idaho, will soon begin constructing a sawmill. Milling machinery will be purchased.

The Royal Basin Mining Company, Phillipsburg, Mont., is having plans completed for an electric power plant.

The Bingham County Power Company, Boise, Idaho, has filed articles of incorporation to operate several power plants to supply surrounding cities. The company is capitalized at \$50,000, and has as directors: J. M. Stevens, J. T. Carruth, and W. R. Jones, of Blackfoot, and others.

## Eastern Canada

TORONTO, May 30, 1914.

The Canadian Kodak Company, Ltd., Toronto, Ont., the Canadian branch of the Eastman Kodak Company, Rochester, N. Y., has purchased 24 acres of land in the suburbs of Toronto, and has plans that cover the immediate erection of seven factories, having a total floor space of 11 acres. The plans include the erection of a power house and an initial installation of one 1500-hp. boiler and three steam-driven electric generators having a total capacity of 1000 hp. Three refrigerating machines of 500 tons per day total capacity will also be installed. The estimated first cost is \$1,500,000.

The Canadian Furniture Manufacturers, Ltd., Woodstock, Ont., has been incorporated with a capital stock of \$3,000,000 by William Bain, Joseph Ellis, J. J. Dashwood and others to manufacture furniture.

The Town Council, Watford, Ont., has authorized the erection of a pump-house, etc., and will install a fire pump. Plans are by F. W. Thorold, Toronto, the engineer. The estimated cost is \$37,000.

The Premier Glass Company of Canada, Ltd., Montreal, has been incorporated with a capital stock of \$3,000,000 by William Taylor, C. Nicholson, J. Montle and others to manufacture glass, etc.

The Universal Providers Company, Ltd., Montreal, has been incorporated with a capital stock of \$50,000 by H. C. Parent, Point Claire, Que., and others, to manufacture machinery, etc.

The Canada Chain Company, Ltd., Sarnia, Ont., has been incorporated with a capital stock of \$40,000 by R. V. Le-

Sueur, A. I. McKinley, N. L. LeSueur, and others, to manufacture lap-welded chain, electric chain, bolts, nuts, etc.

The St. Thomas Electrical Company, Ltd., St. Thomas, Ont., has been incorporated with a capital stock of \$40,000 by F. A. Youmans, B. W. Whitworth, J. T. Webster, and others, to manufacture electrical apparatus, machinery, etc.

The Globe Furniture Company, Waterloo, Ont., will soon commence operations on the erection of its factory. The plant will cost \$125,000.

Little Current, Ont., will erect an electric lighting plant to cost \$12,000.

St. Mary's Cement, Ltd., Toronto, has been incorporated with a capital stock of \$1,500,000 by Alexander Frasken, G. H. Sedgwick, James Aitchison, and others, to manufacture cement, etc.

The George Taylor Hardware, Ltd., New Liskeard, Ont., has been incorporated with a capital stock of \$250,000 by George and W. A. Taylor, and others, to manufacture hardware, etc.

The Berlin Office & Fixture Company, Ltd., Berlin, Ont., has been incorporated with a capital stock of \$60,000 by Simeon Brubacher, J. H. Woolner, Jonas Rudy, and others, to manufacture office furniture and fixtures.

The American Textile Machine Company, Ltd., Toronto, has been incorporated with a capital stock of \$40,000 by J. G. Shaw, Joseph Montgomery, H. P. Edge, and others, to manufacture sewing machines, etc.

The Stratford Mfg. Company, Stratford, Ont., is taking bids for a three-story factory, 75 x 152 ft., for the manufacture of woodenware. Allen P. Boyer, care of Goshen Mfg. Company, Goshen, Ind., is president.

The Canada Furniture Manufacturers, Ltd., Woodstock, Ont., has been incorporated with a capital stock of \$3,000,000 by J. S. Lovell, C. D. Magee, William Bain, and others, of Toronto, to manufacture furniture, etc.

The National Rubber Company, Ltd., Hamilton, Ont., has been incorporated with a capital stock of \$500,000 by George Wenig, D. B. Wood, C. L. Boyd, and others, to manufacture tires and other rubber goods.

The Ladder Lake Lumber Company, Ltd., Toronto, has been incorporated with a capital stock of \$400,000 by Gerard Ruel, A. J. Reid, W. L. Pinkney, and others, to manufacture lumber, etc.

The Dominion Clay Products Company, Ltd., Toronto, has been incorporated with a capital stock of \$350,000 by A. W. Wright, W. C. Bonnell, J. J. Beck and others to manufacture brick, tile, etc.

The Welo Steam Specialty Company, Ltd., Toronto, has been incorporated with a capital stock of \$40,000 by Ralph Winn, G. L. Smith, R. P. Saunders and others to manufacture steam specialties, appliances and supplies.

The Monarch Refillable Fuse Company, Ltd., Hamilton, Ont., has been incorporated with a capital stock of \$40,000 by Salem Coons, Judson Culp, J. G. Anderson and others to manufacture electrical supplies, etc.

The Town Council, Aylmer, Ont., D. C. Davis, clerk, has voted to install an electric pumping system in connection with the waterworks.

The Burnaby Lumber Company, Ltd., Toronto, has been incorporated with a capital stock of \$40,000 by R. W. E. Burnaby, Norman Sommerville, H. A. Newmann and others, to manufacture lumber, etc.

W. K. Greenwood, Orillia, Ont., engineer, has prepared plans for the remodeling of the water system there. A Diesel engine, turbine pumps, etc., will be installed.

The Moore Hardware Company, Ltd., St. Catharines, Ont., has been incorporated with a capital stock of \$50,000 by A. W. Moore, J. B. Archer, C. D. Home and others to manufacture hardware and machinery.

## Government Purchases

WASHINGTON, D. C., June 1, 1914.

The commissioners of the District of Columbia, Washington, room 320, District Building, will receive bids until June 10, for furnishing one universal high-power milling machine, motor-driven; until June 22, for furnishing one derrick crane, high 2 ft. 9 in.

D. E. Gargas, chief clerk of the commissioners of the District of Columbia, Washington, has plans covering the erection of reinforced concrete and brick repair shops, one and two stories, 50 x 150 ft., to cost about \$50,000. No date for receiving bids has been set, and additional information is not available.

Bids will be received by the paymaster general, Navy Department, Washington, until June 9, schedule 6315, steam engineering, class 151, for one planer, for Philadelphia.

Bids were received at the Bureau of Supplies and Accounts, Navy Department, Washington, May 26, for furnishing material for the navy yards as follows:



## Schedule 6685, Construction and Repair.

Class 3, Mare Island—Five portable rivet forges—Postponed to June 9.

Alternate—Same f.o.b. works—Postponed to June 9.

## Schedule 6686, Medicine and Surgery.

Class 11, f.o.b. Bixey, Colo.—One motor-driven universal woodworker—Postponed to June 9.

Alternate—Same, f.o.b. works—Postponed to June 9.

## Schedule 6705, Steam Engineering.

Class 41, Annapolis—One combination patternmaker's disk grinder and roll sander—Bid 131, \$800; 186, \$900 and \$875; 217, \$495.

## Schedule 6706, Steam Engineering.

Class 42, Philadelphia—One toolmaker's lathe—Bid 186, \$1161.75; 247, \$1250 and \$1220.

Class 43, Philadelphia—One combined wet and dry grinder, motor driven—Bid 61, \$149; 66, \$177.50; 169, \$173; 186, \$170; 213, \$267.50; 293, \$185.

## Schedule 6710, Construction and Repair.

Class 61, Charleston, S. C.—One single-frame guide ram forge hammer—Bid 38, \$2870; 186, \$2725; 205, \$2980; 227, \$2775 and \$2525; 270, \$2570, \$2630, \$2695 and \$2840; 313, \$6900; 330, \$2755.

Class 62, Charleston, S. C.—One bulldozer bending machine—Bid 186, \$1285; 205, \$1811.

## Schedule 6711, Steam Engineering.

Class 71, Charleston, S. C.—One set horizontal plate-bending rolls—Bid 28, \$1996 and \$1956; 135, \$2127.90; 138, \$1836; 152, \$2200; 186, \$1665, \$1675 and \$1700; 205, \$2593; 213, \$2560 and \$2725; 227, \$2598 and \$2554; 256, \$2246.50; 289, \$2500; 341, \$2150.25 and \$2240.25; 355, \$3250 and \$2885; 356, \$2690.

Class 72, Charleston, S. C.—One wall radial drill—Bid 242, \$960; 289, \$825; 319, \$1050; 356, \$808.

Class 73, Charleston, S. C.—One gate or squaring shear—Bid 7, \$2500; 28, \$2507 and \$2584; 135, \$2815.90; 138, \$2765; 152, \$3150; 186, \$2520; 205, \$2790; 299, \$1445; 307, \$3400; 341, \$3500; 355, \$3410 and \$3150; 356, \$3015.

Class 74, Charleston, S. C.—One single-end punching machine—Bid 28, \$914; 135, \$1002.70, \$1026, \$939.70 and \$963; 138, \$940; 186, \$920; 205, \$1174; 213, \$920; 227, \$871; 289, \$930; 341, \$950.

Class 75, Charleston, S. C.—One single-end shearing machine—Bid 28, \$914; 135, \$1025.20, \$1048.50, \$962.20 and \$985.50; 138, \$955; 186, \$910; 205, \$1146; 213, \$950; 227, \$892; 289, \$950; 341, \$950.

Class 76, Charleston, S. C.—One standard-gear double cam brake—Bid 95, \$364; 169, \$506; 186, \$500, \$525 and \$635; 213, \$499; 221, \$517.20; 227, \$504; 289, \$504; 355, \$498 and \$590.

Class 77, Charleston, S. C.—One 10-ft. quick-acting flanging clamp—Bid 138, \$525; 169, \$496; 205, \$500 and \$528; 256, \$457.50; 341, \$530; 355, \$387 and \$466.

Class 78, Charleston, S. C.—One gate or squaring shear—Bid 7, \$925; 28, \$848 and \$823; 135, \$1150.10, \$1206.80, \$1073.10 and \$1129.80; 152, \$1050; 186, \$895; 205, \$1077; 213, \$1400 and \$1390; 299, \$972; 307, \$1300; 355, \$1088 and \$1075.

Class 79, Charleston, S. C.—One single vertical punching machine—Bid 28, \$514; 135, \$482.70 and \$454.70; 138, \$555 and \$530; 186, \$520; 205, \$737; 213, \$530 and \$440; 227, \$509; 289, \$305; 299, \$672; 341, \$529.

Class 80, Charleston, S. C.—One set double back-gear bending rolls—Bid 28, \$276; 135, \$351.20 and \$330; 186, \$290; 213, \$225 and \$310; 227, \$283; 256, \$404; 299, \$438.

Class 81, Charleston, S. C.—One set plate-bending rolls—Bid 28, \$955; 135, \$1152.70 and \$1089.70; 138, \$1299; 152, \$1100; 186, \$790; 205, \$1025 and \$989; 213, \$1115; 227, \$1012; 256, \$1058; 289, \$1030.

## Schedule 6724, Construction and Repair.

Class 102, Boston (Charlestown), Mass.—One portable compression yoke riveter—Bid 65, \$641; 186, \$640; 319, \$641; 355, \$641; 366, \$195.

## Schedule 6725.

Class 111, Brooklyn—One motor-driven variable speed lathe—Bid 20, \$95, part; 99, \$924.70; 169, \$940 and \$698; 186, \$940; 205, \$923; 227, \$909.

Class 112, Brooklyn—One motor-driven variable speed lathe—Bid 34, \$1768.86; 169, \$2010; 186, \$1470; 205, \$1720; 220, \$1408.77; 227, \$1927.

Class 113, Brooklyn—One upright drill—Bid 132, \$419; 169, \$327 and \$492; 186, \$385; 205, \$489; 213, \$360; 227, \$504 and \$494.

Class 114, Brooklyn—One double emery grinder—Bid 24, \$285.45; 66, \$197.60; 186, \$190 and \$197.60; 316, \$105.45.

Class 115, Brooklyn—One motor-driven grindstone—Bid 169, \$123.50; 213, \$142.50; 368, \$164.18.

The names of the bidders and the numbers under which they appear in the above list are as follows:

7, Aetna Foundry & Machine Company; 20, American Steam Pump Company; 24, Bridgeport Safety Emery Wheel Company; 28, Bertsch & Co.; 34, Brown & Sharp Mfg. Company; 38, Buffalo Foundry & Machine Company; 61, Cincinnati Electrical Tool Company; 65, Chicago Pneumatic Tool Company; 66, James Clark, Jr., Electric Company; 95, Eureka Fire Hose Mfg. Company; 99, The Fairbanks Company; 131, Gardner Machine Company; 132, Garvin Machine Company; 135, Huntington Machine & Foundry Company; 138, Hillis & Jones Company; 152, Ironton Punch & Shear Company; 169, Kemp Machinery Company; 186, Manning, Maxwell & Moore; 195, Mathis & Son; 205, Niles-Bement-Pond Company; 213, D. Nast Machinery Company; 217, Oliver Machinery Company; 220, Oesterlein Machine Company; 221, George A. Ohl & Co.; 227, Prentiss Tool & Supply Company; 242, Pawling & Harnischfeger Company; 247, Pratt & Whitney Company; 256, Joseph T. Ryerson & Son; 270, William Sellers & Co.; 277, Snyder & Raub; 282, B. F. Sturtevant Company; 299, Scully Steel & Iron Company; 293, Stow Mfg. Company; 289, D. H. Stoll Company; 307, Toledo Machine & Tool Company; 313, United Engineering & Foundry Company; 316, Valley City Machine Works; 319, Vulcan Engineering Sales Company; 330, William H. Wood; 341, Wicks Brothers; 352, Mathis Brothers Company; 355, F. A. Branda & Co.; 356, Cleveland Punch & Shear Works; 366, F. T. Simmons; 368, American Woodworking Machinery Company.

## Trade Publications

**Boiler Tube Cleaners.**—Lagonda Mfg. Company, Springfield, Ohio. Bulletin Z, entitled Scale Removal in Fire Tube Boilers. Presents illustrations and a brief description of a line of fire tube boiler cleaning apparatus, including a recently developed clover leaf vibratory knocker head, in which the head is thrown from side to side and strikes every portion of the inner circumference of the tube.

**Machine and Foundry Work.**—North Star Iron Works, Owatonna, Minn. Pamphlet. Describes a line of saws and machinery which includes emery wheel and polishing stands, feed pumps, etc. Illustrations, complete descriptions and tables of specifications are included.

**Pumps.**—Crestline Mfg. Company, Crestline, Ohio. Catalogue D, supersedes all previous issues and presents illustrations of an extensive line of pumps for all classes of service. Brief descriptions and specification tables accompany the engravings. Mention is also made of the number of accessories, such as pipe and fittings, screens, well drilling apparatus, power pumps, etc. A list of repair parts is given for each of the pumps.

**Boiler Circulator.**—Klein Boiler Circulator Co., 30 Church street, New York City. Folder. Presents drawings of an apparatus for maintaining a thorough circulation of water in boilers. The function of this device is to raise the cold water from the bottom of the boiler, warming it at the same time and to discharge it on the surface. The advantages of the device, which include an increased boiler efficiency and reduced fuel consumption, are briefly touched upon.

**Safety Valves.**—Consolidated Safety Valve Company, 113 West Fortieth street, New York City. Manual C-D. Describes briefly the company's locomotive type of pop safety valves, with instructions for repairing and setting them. Dimension tables are given and an appendix of engineering data and useful information is included.

**Electric Railway Supplies.**—Ohio Brass Company, Mansfield, Ohio. Catalogue No. 14, superseding and cancelling all other catalogues except valve catalogue No. 50. Covers a complete line of appliances used in the construction and operation of electric railway and mine haulage systems and transmission lines. For the most part, a single page is given to each appliance with an illustration, brief description and list of sizes. In some cases where a great variety of sizes are made two pages are required, the illustration and description occupying one, while the specification table is given on the facing one. Tables of useful information and code word, catalogue number and alphabetical indices are included.

**Metal Sheets.**—Portsmouth Steel Company, Portsmouth, Ohio. Card. Contains a sheet metal scale, which gives the weight per sheet and per bundle and the number of sheets in a bundle for various widths, lengths and gauges. The card is arranged with windows, and when the proper gauge number is exposed, the information can be read for widths of 24, 26, 28, 30 and 36 in. and lengths of 72, 84, 96, 120 in. at the other openings in the surrounding envelope. Mention is made of the various products of the company, which include Portsmouth iron sheets, Ohio metal which is a copper bearing steel, black and galvanized sheets and galvanized formed roofings.

**Clam Shell Buckets.**—Industrial Works, Bay City, Mich. Bulletin No. 212. Concerned with a line of power wheel and high power clam shell buckets for handling earth, coal, coke, ashes, ore, rock, ballast, gravel, sand, etc. Illustrations with brief descriptions and specification tables of the two types are given, together with a number of views showing the buckets in use.

**Moulds.**—Chas. K. Schweitzer Company, 214 Vine street, St. Louis, Mo. Catalogue. Describes a line of moulds for solder, babbitt, block lead, tin and linotype metal. For the most part, the catalogue is made up of engravings of the different moulds and their products, but some short descriptions are included. Mention is also made of steel letters and figures and stamps and dies that can be supplied for marking metal.

**Portable Truck and Wagon Loader.**—Link-Belt Company, Chicago, Ill. Book No. 190. Gives illustrations and specifications of a standard line of portable wagon and truck loaders for loading loose materials from ground storage and shows some of the special machines that have been built to meet individual requirements. Among the classes of material handled are anthracite and bituminous coal, sand, stone, gravel and similar loose materials, coke at gas plants, clinkers at cement mills and foundry refuse at manufacturing plants. Testimonial letters and a partial list of users are included as well as sketches showing various ways in which the device can be used. Mention is also made of the various other products of the company which include retail coal pockets, car unloaders of either the movable or stationary type and locomotive cranes.



